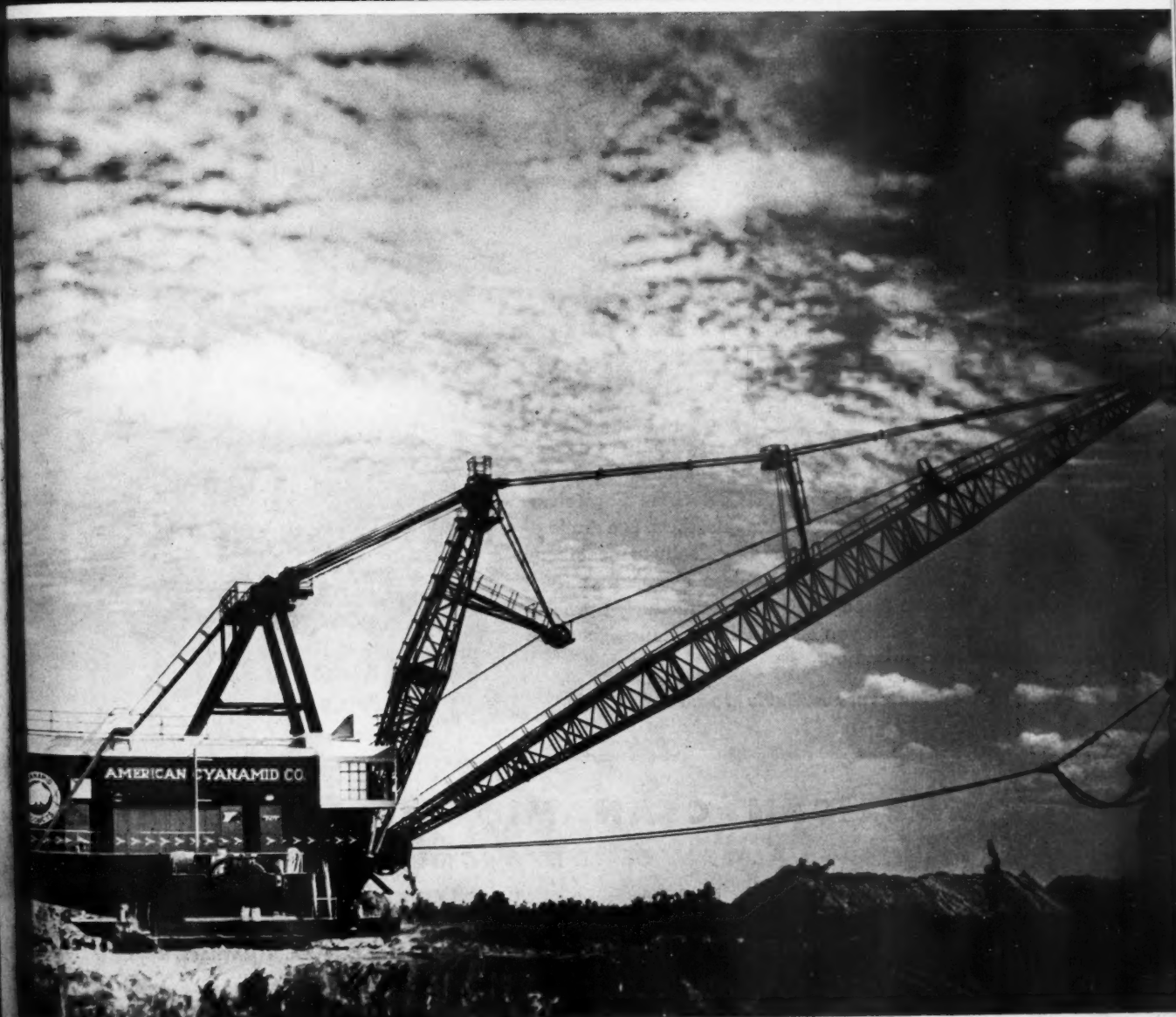
Mining

CONGRESS JOURNAL



AMERICAN
CYANAMID COMPANY
EXPLOSIVES

"TAILORING" THE BLAST TO YOUR SPECIFIC NEEDS!

Testing ammonium nitrate for sizing and density to control rate of detonation is just one of many painstaking laboratory procedures behind each grade of AMERICAN Explosives. For, whatever your blasting requirements, there is a grade of AMERICAN Explosives "tailored" specifically to meet them. And intensive laboratory research, close chemical control, and unremitting care throughout the manufacturing process guarantee that the grade you select will do its assigned job efficiently and economically.

• *Capable field engineers are available at your call.*

★ HIGH EXPLOSIVES

★ PERMISSIBLES

★ BLASTING POWDER

★ BLASTING ACCESSORIES

AMERICAN CYANAMID COMPANY

EXPLOSIVES DEPARTMENT

30 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

SALES OFFICES: PITTSBURGH, PA. • BLUEFIELD, W. VA. • SCRANTON, PA. • CHICAGO, ILL. • POTTSVILLE, PA. • MAYNARD, MASS.

Mining Congress Journal

Contents

VOLUME 33, NUMBER 7 FOR JULY, 1947

JULIAN D. CONOVER
Editorial Director

JULIAN W. FEISS
Editor

★

Associate Editors
A. W. DICKINSON G. B. SOUTHWARD
H. L. MOFFETT

Production
B. C. WILKERSON

Advertising
P. D. MCMURRER, Mgr.
FRANK W. MORAN (*Chicago*) RALPH F. DUYSTERS (*New York City*)
RALPH W. HARKER (*Los Angeles and San Francisco*)

★ ★ ★

FRONT COVER: This giant walking dragline with a 175-ft. boom is operating at American Cyanamid's Saddle Creek mine in Polk County, Florida. It handles 24 tons to the bite.

PAGE

EDITORIALS 21

SAFETY PAYS OFF AT EAGLE-PICHER 22
By H. B. HUTCHENS

TIME STUDIES TO IMPROVE MECHANICAL OPERATION 26
By DAVID R. MITCHELL and RICHARD L. ASH

STREAM POLLUTION CONTROL IN IDAHO 32

AN EXPERIMENT WITH TUNGSTEN CARBIDE BITS 36
By C. W. NICOLSON

ACTIVITIES OF THE COAL DIVISION 39

WHEELS OF GOVERNMENT 43

PERSONALS 46

NEWS AND VIEWS 49

MEETING OF UNUSUAL INTEREST PLANNED FOR EL PASO 57

MANUFACTURERS FORUM 62

Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

Copyright 1947, by
THE AMERICAN MINING CONGRESS
309 MUNSEY BLDG., WASHINGTON 4, D. C.

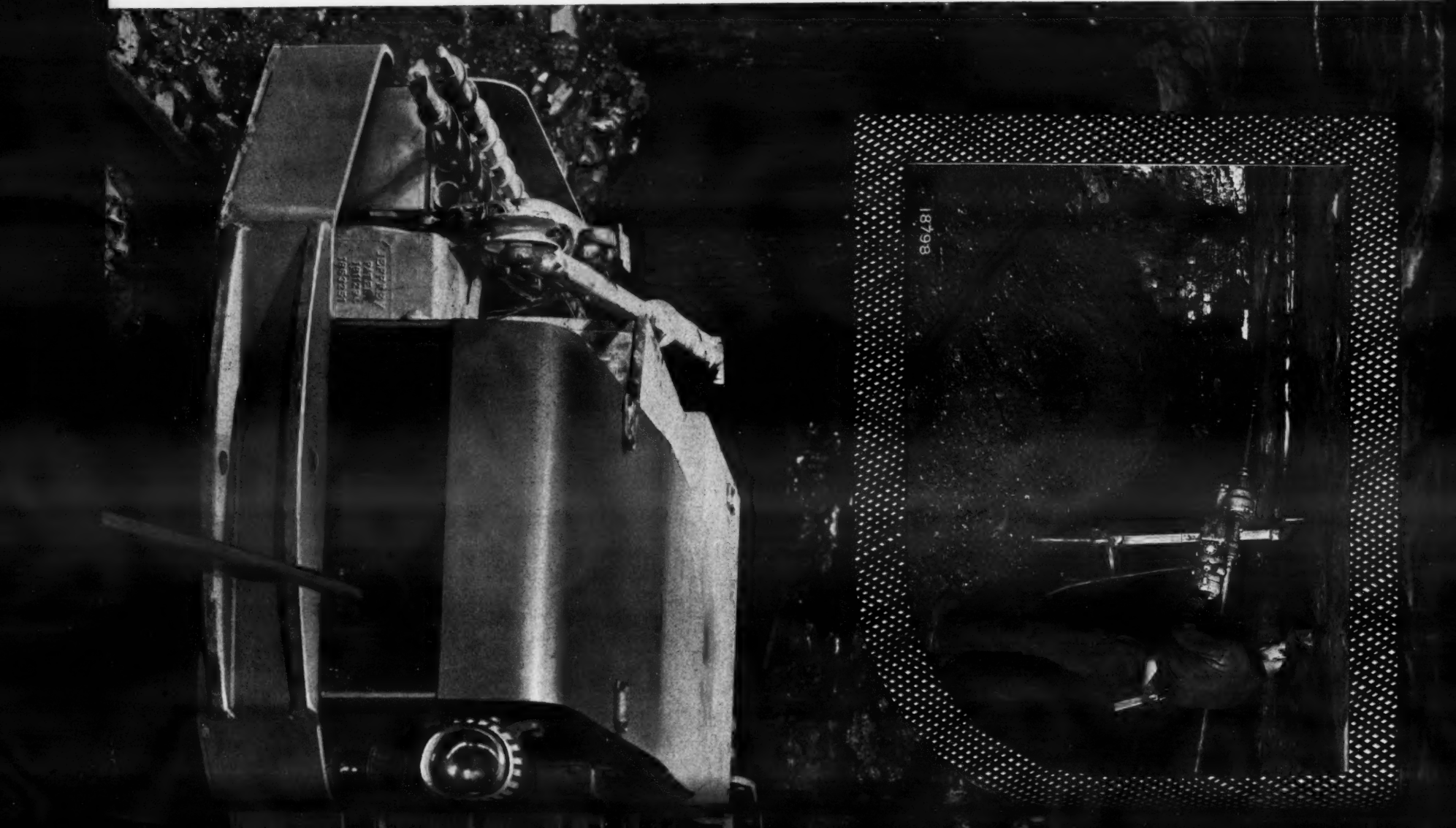
HOWARD I. YOUNG, *President* DONALD A. CALLAHAN, *Vice President* LOUIS S. CATES, *Vice President* JAMES D. FRANCIS, *Vice President* JULIAN D. CONOVER, *Secretary*

Published Monthly. Yearly subscriptions, United States, Canada, Central and South America, $3.00. Foreign, $5.00. Single copies, $0.30. February Annual Review Issue, $1.00. Entered as Second-class Matter, January 30, 1915, at the Post Office at Washington, D. C.
Member, Audit Bureau of Circulations

THE JEFFREY MANUFACTURING COMPANY

958-99 North Fourth Street, Columbus 16, Ohio

CUTTERS • DRILLS • LOADERS • LOCOMOTIVES • JIGS • FANS • UNDERGROUND CONVEYORS



429-43
311-45

Kennametal bits costly?

Not when they can cut an average of 2 1/2 tons of coal for—

KENNAMETAL BITS ARE MANUFACTURED TO FIT ALL STANDARD MAKES OF CHAINS

U1	Short or Longwall Machines	Cincinnati	Goodman	Jeffrey	Prox	Sullivan	Tracy
U2	Number 50, 52, 54 Chains	———	Goodman	Buddy Sullivan	——	———	——
U3	Mounted Track or Rubber Tired Gage	Cincinnati	Goodman	Jeffrey	Prox	Sullivan	Tracy
U4	Mounted Track or Rubber Tired Gage	Cincinnati	Goodman	Jeffrey	Prox	Sullivan	Tracy
U5	Mounted Track or Rubber Tired Gage	Bowdil, ML Type only	———	———	——	———	——
U6	Mounted Track or Rubber Tired Gage	Cincinnati Duplex	———	———	——	———	——
U7	Mounted Track or Rubber Tired Gage	Cincinnati	Goodman	Jeffrey	Prox	Sullivan	Tracy
U8	Short or Longwall Machines	Cincinnati	Goodman	Jeffrey	Prox	Sullivan	Tracy

PRICES

CAT. NO.	Prices Each in Lots of		
	50-99	100-499	500 or more
U1	$1.15	$1.05	$.95
U2	1.15	1.05	.95
U3	1.15	1.05	.95
U4	1.15	1.05	.95
U5	1.30	1.20	1.10
U6	1.30	1.20	1.10
U7	1.35	1.25	1.15
U8	1.35	1.25	1.15

Some examples where the coal seam is medium hard to hard are:

Washington County, Pa., Pittsburgh Seam:
Bit cost per ton of coal mined — .4 of one cent.

Somerset County, Pa., "B" Seam:
Bit cost per ton of coal mined — .36 of one cent.

Harrison County, W. Va., Pittsburgh Seam:
Bit cost per ton of coal mined — .98 of one cent.

At the Brownfield Coal Co., Moxahala, Ohio, No. 6 Seam, the bit cost per ton of coal mine was reduced from 12 cents to 1 cent.

There are other ways Kennametal bits help to reduce the total cost of cutting coal. Fewer bit changes are required and fewer men are needed to sharpen, handle and haul bits to and from the face. Less time is wasted changing and resetting bits. The machine operates at lighter loads—lasts longer—cuts faster—because the hard, wear-resistant Kennametal cutting edge stays sharp long after steel bits dull.

In seven out of ten cases cuttings are larger . . . less "bug dust" is formed.

Despite the fact that Kennametal bits are priced at between $.95 and $1.35, depending on size and quantity, they lower cost in terms of less labor, less maintenance on machines, lower power cost, and increased mining efficiency.

A Kennametal representative will be glad to contact you for a demonstration. Simply write Mining Division, Kennametal Inc., Latrobe, Pennsylvania.

KENNAMETAL

MINING DIVISION

KENNAMETAL INC., LATROBE, PA., U. S. A.

POWER... plus SAFETY

Exide-Ironclad Batteries and fast, flexible shuttlecars . . .

They provide the right combination needed to meet the newer safety requirements demanded in coal mines. And *more* than safety, with Exide-Ironclad powered shuttlecars coal moves faster from loaders to the main line, gathering costs are reduced, and tonnage figures climb.

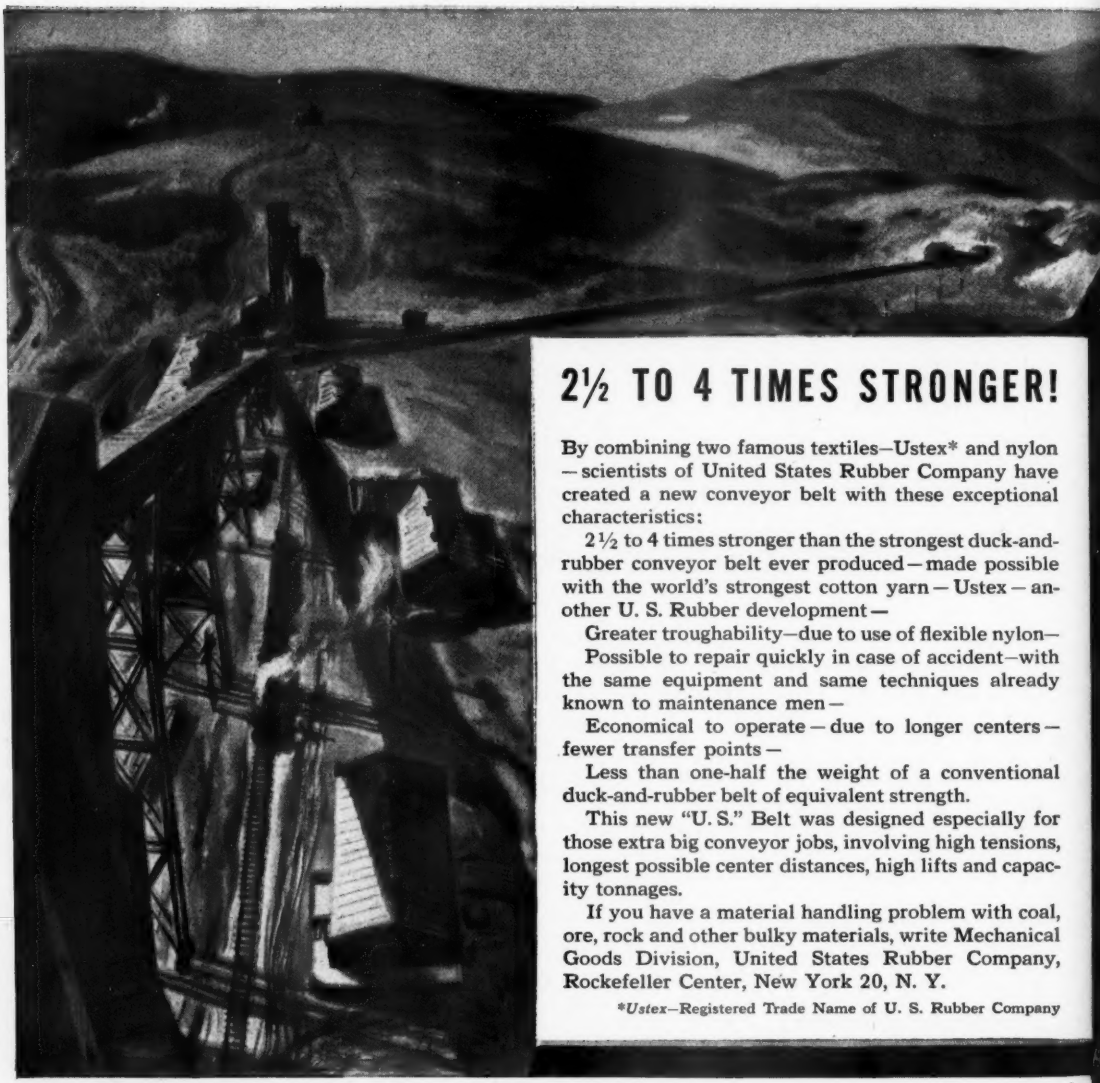
Exide-Ironclad Batteries for shuttlecars, locomotives and trammers are used by more mine operators than all other batteries combined. They have the *high power ability* that frequent stop-and-go service requires; a *high maintained voltage* throughout discharge; the *high capacity* needed to assure full shift availability; plus dependability, long life and ease of maintenance.

If you have a special battery problem, or wish more detailed information, write for booklet Form 1982.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 · Exide Batteries of Canada, Limited, Toronto

UNITED STATES RUBBER COMPAN

AN AMAZING NEW



2½ TO 4 TIMES STRONGER!

By combining two famous textiles—Ustex* and nylon—scientists of United States Rubber Company have created a new conveyor belt with these exceptional characteristics:

2½ to 4 times stronger than the strongest duck-and-rubber conveyor belt ever produced—made possible with the world's strongest cotton yarn—Ustex—another U. S. Rubber development—

Greater troughability—due to use of flexible nylon—

Possible to repair quickly in case of accident—with the same equipment and same techniques already known to maintenance men—

Economical to operate—due to longer centers—fewer transfer points—

Less than one-half the weight of a conventional duck-and-rubber belt of equivalent strength.

This new "U. S." Belt was designed especially for those extra big conveyor jobs, involving high tensions, longest possible center distances, high lifts and capacity tonnages.

If you have a material handling problem with coal, ore, rock and other bulky materials, write Mechanical Goods Division, United States Rubber Company, Rockefeller Center, New York 20, N. Y.

**Ustex*—Registered Trade Name of U. S. Rubber Company

FOR SUPER-TENSION

CONVEYOR JOBS..:.COAL • ORE • ROCK • GRAVEL

..Serving Through Science...ANNOUNCES

CONVEYOR BELT

PERFECT

for easier handling.....

Holding handle is located above the center of gravity. Balanced distribution of weight assures easier handling and provides simplified control of the stoper.

Extra long chuck has extra large bearing surface for proper alignment and longer life.

To prevent the entrance of dirt or water, air is fed to the chuck automatically.

A double tube is used. Air flow is automatically maintained in the outer tube. The inner tube is for water.

Side rod nuts located at feed leg collar position. The feed cylinder can be removed without disturbing the assembly of the front head, cylinder and back head.

Control of the powerful feed leg is new and more positive.

Throttle handle is raised to start the stoper, lowered to stop it. Falling rock cannot start the 600.

Powerful rotation. Oversize rifle bar and large bronze rifle nut assures added tool life and very powerful rotation.

Extra Job-Tested Features:

A built-in oil reservoir and a force feed system in which the correct amount of lubricant is metered out by a plunger gives the most efficient type of lubrication to all parts, including the chuck. Thor's famous air valve has large bearing areas, extreme light weight and short travel. Results are faster action and longer life.

BALANCE...

on the job!

THE NEW Thor

STOPER ROCK DRILL
MODEL 600

Outstanding for drilling speed and handling ease! That was the verdict for the new Thor "600" Stoper after rugged field tests. *Perfect balance*—providing a new ease in handling, plus positive control in any position—scored the "600" with drill runners. *Speed*—faster penetration . . . more footage per shift because of increased handling efficiency—scored with operators. Try the "600" yourself—call your nearest Thor branch for a demonstration.

INDEPENDENT PNEUMATIC TOOL COMPANY
600 W. Jackson Boulevard, Chicago 6, Illinois

Export Division: 330 West 42nd St., New York 18, New York

Birmingham	Boston	Buffalo	Cincinnati	Cleveland	Denver	Detroit
Houston	Los Angeles	Milwaukee	New York	Philadelphia	Pittsburgh	St. Louis
St. Paul	Salt Lake City	San Francisco	Toronto, Canada	Sao Paulo, Brazil		London, England

Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

You Get GOULD Service

If you are on the Map

Gould "Twin Power" Batteries have the proven Kathanode construction: specially designed grids, long lasting Black Oxide active material, mats of layered spun glass, perforated rubber envelopes and Durapor rubber separators. To this Gould has added "Twin Power," a refinement in plate balance that gives even longer, more dependable and sustained power.

Gould Service Engineers will make periodic inspections of your batteries. In the case of damaged units, on-the-spot repairs will be made whenever possible. Gould Service Engineers can also advise on proper installations and help set up correct battery servicing and maintenance schedules.

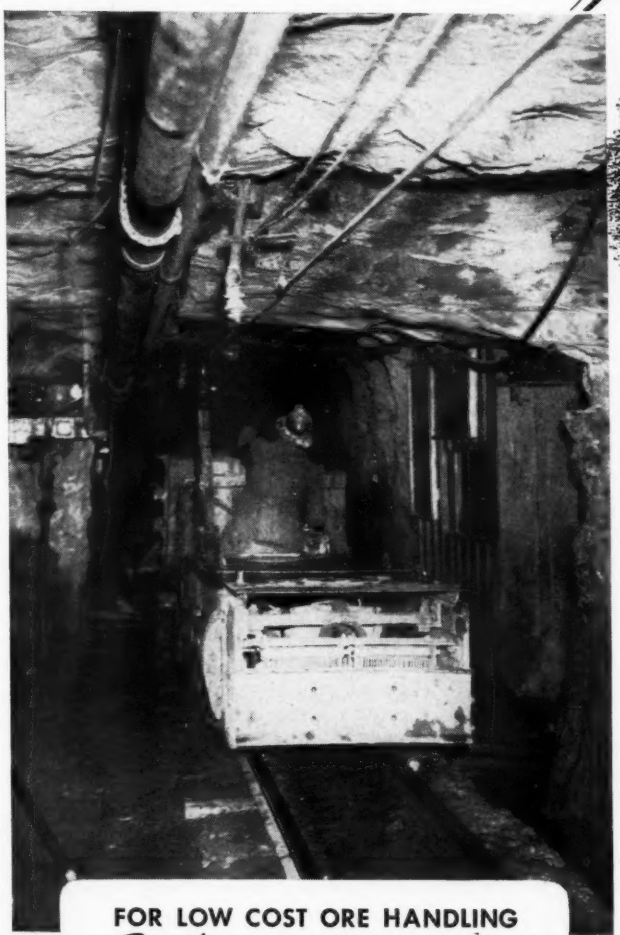
Gould service centers are located in every industrial area. Call or wire Gould in any of the following cities:
Boston, Mass. • Cincinnati, Ohio • Cleveland, Ohio • Chicago, Ill. • Denver, Colo. • Depew, N. Y. Detroit, Mich. • East Point, Ga. • Kansas City, Mo. Los Angeles, Cal. • New York, N. Y. • Philadelphia, Pa. • Pittsburgh, Pa. • St. Louis, Mo. • St. Paul, Minn. • San Francisco, Cal. • Washington, D. C. West Salem, Ore. • Kingston, Ont., Canada.

GOULD STORAGE BATTERY CORPORATION, Depew, N. Y.

GOULD KATHANODE BATTERIES

When in the Buffalo area visit the Gould Research Laboratory. See for yourself how modern research is solving your battery problems.

American Zinc Finds Trolley Haulage Best



FOR LOW COST ORE HANDLING
Specify O-B TROLLEY MATERIALS

FOR LOW-COST ORE HANDLING

Operating in a low-grade ore body averaging from but 3 to 4.5 per cent sphalerite, the American Zinc Lead and Smelting Company consistently mines its Mascot properties at a profit by obtaining high tonnages at rock-bottom cost. Economy and efficiency are watchwords at Mascot. Take, for example, the underground haulage system. After investigating various methods, American Zinc found it could move more ore for less money with electrified trolley haulage. More than 20 miles of trolley overhead now serve the three mines operating in the Mascot area.

Overhead trolley line materials were selected with the same studied care. Because O-B materials require but minimum maintenance and are built for years of trouble-free service, their choice was inevitable. O-B materials will perform equally well on your system. Follow the experience of American Zinc and specify O-B for your next trolley installation.

MANSFIELD, OHIO
CANADIAN OHIO BRASS CO., LTD.
NIAGARA FALLS, ONTARIO

2817-M

These Advantages of

"NITRAMON"

Help Stripping Operators

GET OUT MORE COAL —FASTER

Typical 40-foot shale and limestone overburden of stripping operation in western Pennsylvania, as 17-hole shot is loaded.

4½-inch "Nitramon" Primer with Primacord attached is safely loaded into horizontal hole 36 feet deep.

After shot was fired. Splendid fragmentation obtained with "Nitramon" helps speed removal of rock.

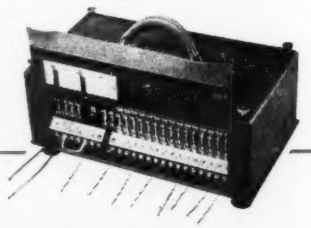
Du Pont "Nitramon" is an ideal blasting agent for coal stripping operations. Check these important reasons why:

1. **Safer.** "Nitramon" is safe to handle; safe to load. Cannot be detonated by the strongest blasting caps, open flame, friction, Primacord or even impact of rifle bullets. Yet it is readily fired with "Nitramon" Primer . . . itself relatively insensitive.
2. **Convenient.** "Nitramon" comes packed in easily handled metal containers that help speed loading. Charges of required strength can be easily made up.
3. **Water-resistant.** The containers of "Nitramon" are watertight and can be safely loaded in horizontal or well-drill holes well in advance of firing and whether conditions are wet or dry.
4. **Powerful.** "Nitramon" packs the power to do a thorough job of breaking up the over-burden.
5. **Non-headache-producing** . . . a benefit that insures clear-headedness, helps eliminate delays, and aids in keeping the work on schedule.

"Nitramon" has long been the choice of blasters in many fields. It promotes safety and efficiency. Ask any Du Pont Technical Representative to explain how this safest blasting agent may help you get out more coal—faster. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

(AT RIGHT) Du Pont Blasting Timer* facilitates short interval delay shots with Primacord and instantaneous caps. Reduces vibration. Increases safety. Improves fragmentation.

*PAT. APPLIED FOR



DU PONT "NITRAMON"

A Product of Du Pont Explosives Research

DU PONT

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

TEN speeds in ONE compact unit

Only in Mack trucks or tractors can you get a transmission like this.

It's the Mack Duplex, with ten speeds forward and two reverse — the only two-range, multi-speed arrangement designed and built as an integral unit.

Because it is mounted as a single, complete assembly, the Duplex eliminates the complications of auxiliary transmissions or two-speed axles.

Simpler ... lighter ... more efficient ... it provides ten separate and useful ratios, properly spaced through a liberal range. It assures smooth, even progression through all speeds. It requires but one support and only one bath of oil. And it takes up but little more space than a standard five-speed box.

The Mack Duplex is built entirely in Mack factories ... product of the finest and most modern gear-cutting facilities in the industry. It's one more example of the way Mack's better design pays off in better performance — on the job.

Mack

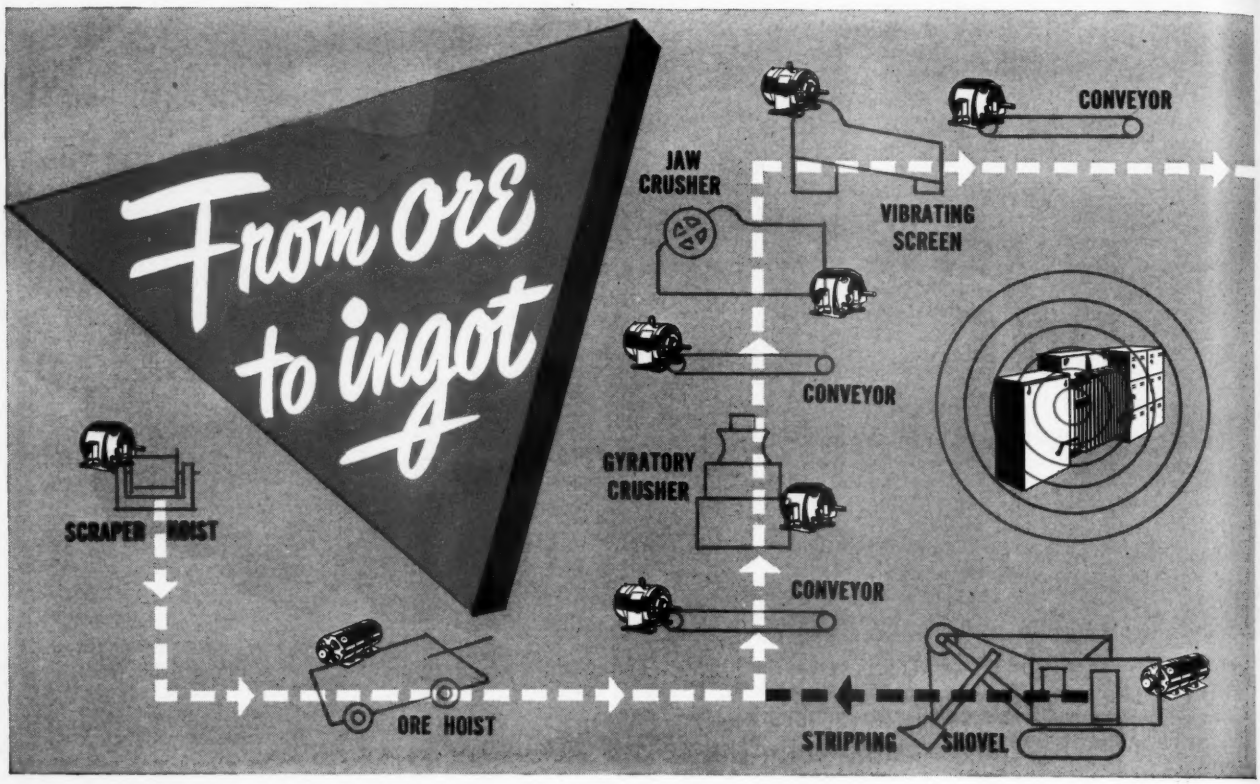
since 1900, America's hardest-working truck

Mack Trucks, Inc., Empire State Building, New York 1, New York.
Factories at Allentown, Pa.; Plainfield, N. J.;
New Brunswick, N. J.; Long Island City, N. Y. Factory
branches and dealers in all principal cities for service
and parts. In Canada, Mack Trucks of Canada, Ltd.

Trucks for every purpose

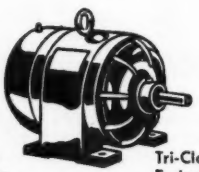
Mack Model LMSW-M is engineered specifically for heavy-duty, off-highway service. As a dumper, it hauls big yardage per load with maximum trips per hour — the formula that transforms ore, rock, coal or earth into real pay dirt. This diesel-powered unit, with 15-ton side-dumping body, is one of three working for Lone Star Cement Co. at its limestone quarries in Greencastle, Ind.

5211

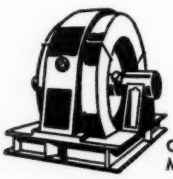


G-E MOTORS AND CONTROL

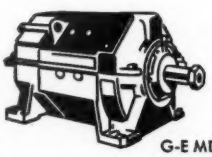
Tri-Clad Open Dripproof Motors



Tri-Clad Totally Enclosed Motors



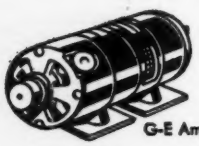
G-E Synchronous Motors



G-E MD-600 Armored Mill Motors

G-E MOTORS can be applied to almost every process used in copper mining, concentrating, and smelting. For average drive requirements, there are G-E Tri-Clad open dripproof motors; for extra-dusty or extra-wet applications, G-E Tri-Clad totally enclosed motors; for drives where better power-factor is essential, G-E synchronous motors; and for heavy-duty applications, G-E armored mill motors. All types feature greater physical strength, electrical balance, and operating stamina.

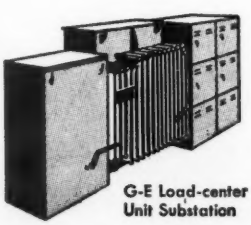
G-E CONTROLS and power distribution equipment are available for every standard and specialized requirement of your plant. For a control device that makes possible high operating speeds on mine hoists and stripping shovels, there is the G-E Amplidyne; for "packaged" low-voltage motor control, G-E Cabinetrol; for protective high-voltage motor control, G-E Limitamp control; and for modern power distribution, G-E load-center unit substations.



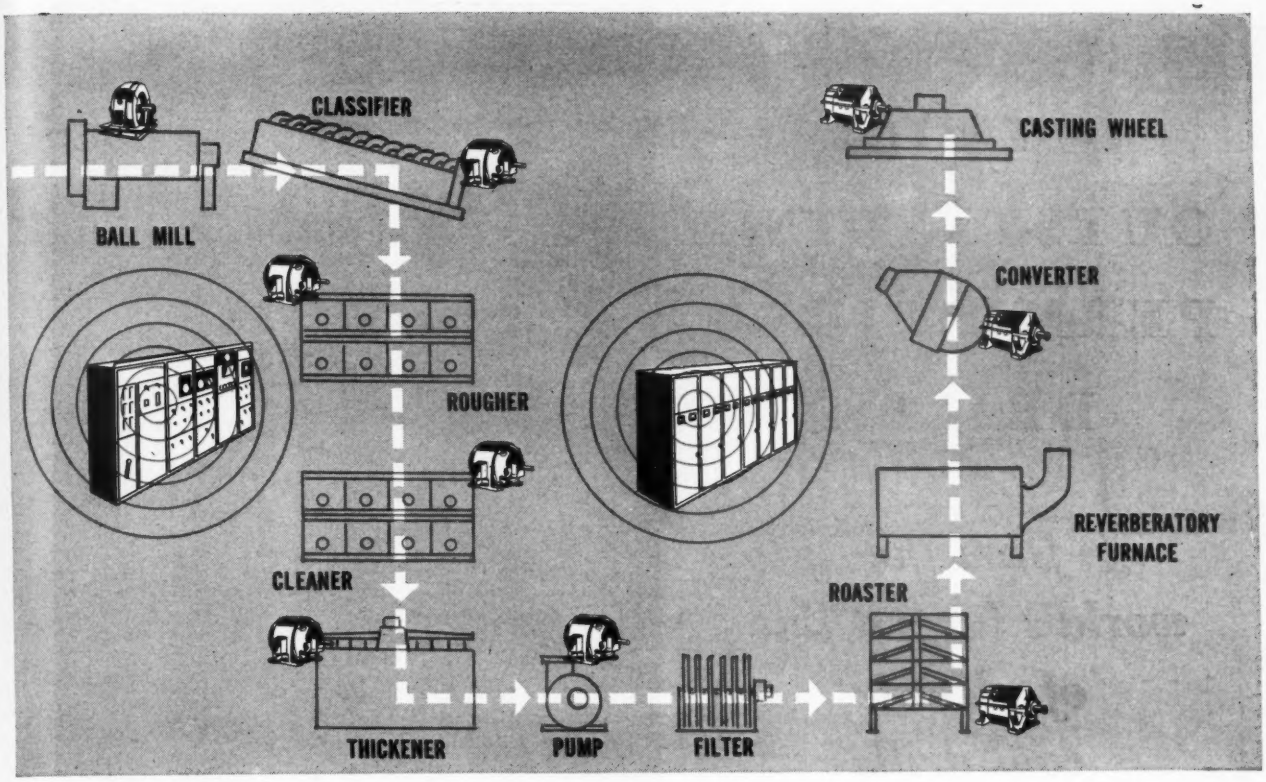
G-E Amplidyne

G-E Limitamp Control

G-E Cabinetrol



G-E Load-center Unit Substation



HELP KEEP COSTS DOWN!

TODAY, more and more copper mining companies are examining their operation flow charts with this vital objective in mind—to offset rising labor and material costs. They know that the application of electric motors and control is the most economical and most efficient means to obtain this objective.

For one thing, electrification with General Electric motors and controls gives you the advantages of *automatic* operation. You eliminate countless manual steps—make better use of your available manpower. General Electric controls also give you precise regulation of ore processing and help to reduce wasted effort and materials. Finally, General Electric motors and controls are dependable, stay on the job for years with only a minimum amount of maintenance.

As manufacturers of every type of electrical equipment for copper mines and processing plants, General Electric can assist you in any electrification program, large or small. *Apparatus Dept., General Electric, Schenectady 5, N. Y.*

MOTORS AND CONTROL
for the
copper industry

GENERAL ELECTRIC

660-11

TWO OUTSTANDING PERMISSIBLE DRILLS

from the world's largest line of electric coal drills

112 holes in 14 hours

Drilling speed up to 40" a minute

The CP No. 574 Permissible Post-Mounted Coal Drill, with a drilling speed up to 40 inches per minute, is easily capable of drilling 40 to 60 holes per shift. The rugged motor, which will stand up under most difficult drilling conditions, complies with all requirements of the U.S. Bureau of Mines, and carries the Bureau's permissible name plate. A drill that is economical to operate and low in maintenance.

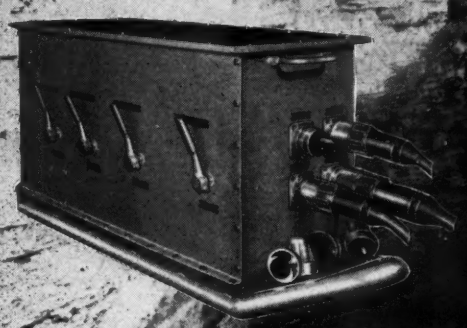
CP No. 572 Permissible Hand-Held Coal Drills, with safety clutch, working in the difficult Alma seam, drill 112 holes, 2¼" diameter by 7 feet deep, each day of two seven-hour shifts. The safety clutch, for release in case the auger sticks, is a valuable protective feature for the operators and motor.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

One of Many Applications OF MINES SAFETY CIRCUIT CENTERS



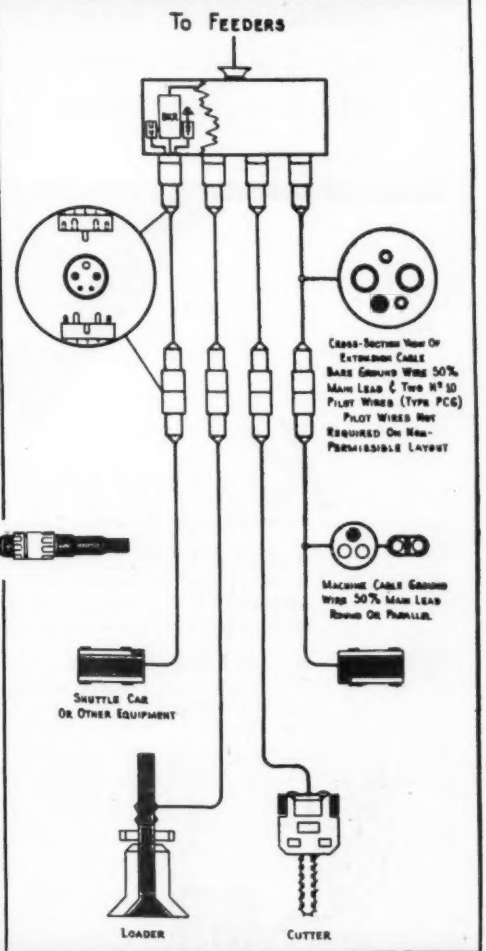
SPECIFICALLY Designed for MINING NEEDS

MINES (U. S. Gov't. approved) Safety Circuit Centers, for operation in gaseous atmosphere, employ circuit breakers with an "intrinsically safe control circuit" to make the connectors drop their load in the process of opening. Thereby eliminating power arcs, through accidental separation, while carrying load.

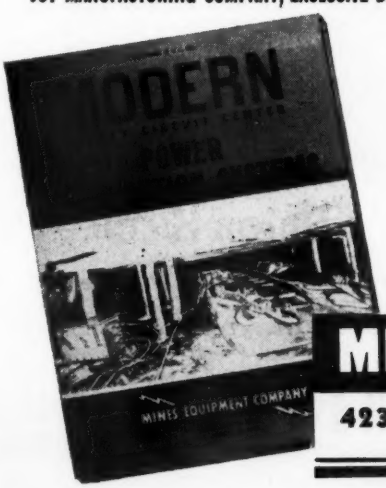
When they can be located in fresh air, the enclosure may be of the more economical dust resistant type (illustrated above). This unit is equipped with the same safety control circuit as the U. S. Gov't. approved unit (shown below) however, it is supplied without the explosion resistant case for each breaker and consequently is lighter in weight. Further advantage is in sectionalizing of cable with permissible type connectors.

Either style, Permissible or Dust Resistant cased, is available in one, two, three or four outlet models with current ratings to match job requirements. *Safety Ground Trip* (optional) available for any outlet, making use of ground fault current to cut off a defective cable or machine.

Before you buy – Get the facts on Safety Circuit Centers *designed for* – not just adapted to – Mining.
WRITE FOR MINES BULLETIN S. C. C. 100 TODAY



JOY MANUFACTURING COMPANY, EXCLUSIVE DISTRIBUTORS TO MINING INDUSTRY



U. S. GOV'T. APPROVED EXPLOSION RESISTANT PERMISSIBLE STYLE SAFETY CIRCUIT CENTER.

MINES EQUIPMENT COMPANY

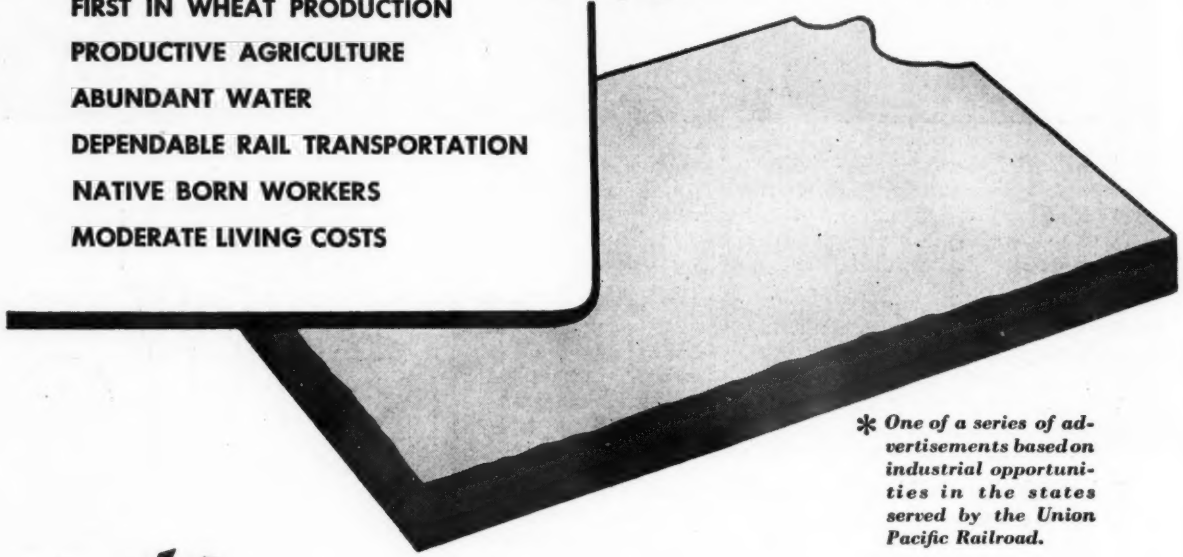
4233 CLAYTON AVE. MINES ST. LOUIS 10, MO.

UNION PACIFIC

TREASURE MAP OF INDUSTRY

Kansas *

RICH NATURAL RESOURCES
CENTER OF NATIONWIDE MARKET
PROGRESSIVE INDUSTRY
FIRST IN WHEAT PRODUCTION
PRODUCTIVE AGRICULTURE
ABUNDANT WATER
DEPENDABLE RAIL TRANSPORTATION
NATIVE BORN WORKERS
MODERATE LIVING COSTS



* *One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*

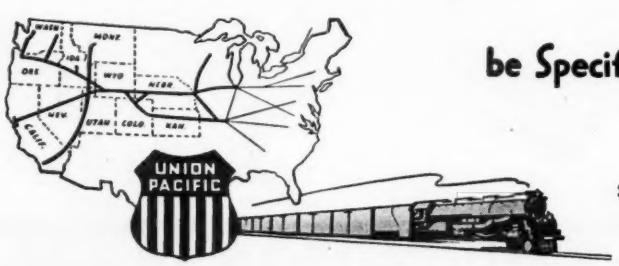
KANSAS—almost in the exact geographical center of the United States; an important factor to industries serving nationwide markets.

Agriculture is king. Kansas normally ranks first in wheat production. In addition to grains, vegetables and fruits, a large part of farm income is derived from livestock and poultry.

Kansas industry keeps step with agriculture. There are approximately 2,500 manufacturing and processing establishments. Over four million tons of coal are mined annually. Here is the largest natural gas field in the world. Eighteen principal rivers with two great watersheds provide an abundance of water. The population is 97 per cent native born.

★ ★ ★

Kansas . . . the hub of a rich market; a treasure chest of natural resources with dependable labor; outstanding public health record; moderate living costs; and excellent transportation over Union Pacific rails.



be Specific – say

"Union Pacific"

* *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebraska, for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE

STANDARD ENGINEERS NOTEBOOK

CALOL

RPM

Standard Diesel Fuel lengthens injector life

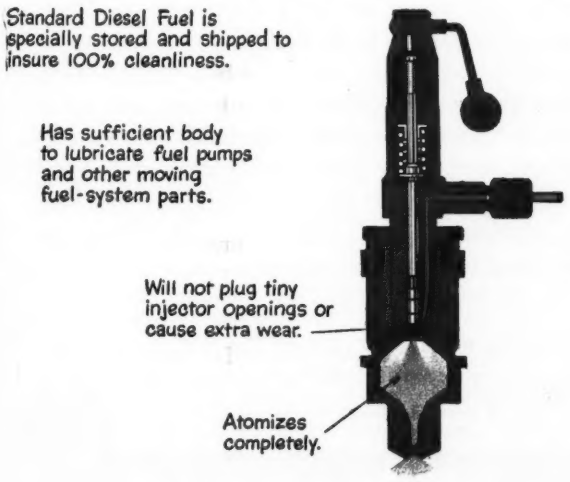
Many Diesel engine operators have minimized fuel system trouble and made parts last longer by the use of 100%-clean Standard Diesel Fuel.

This special fuel is manufactured from the finest crudes and is completely distilled. Numerous checks and rigid control during manufacture assure a uniform high-quality product with just the right body to lubricate all parts in engine fuel systems.

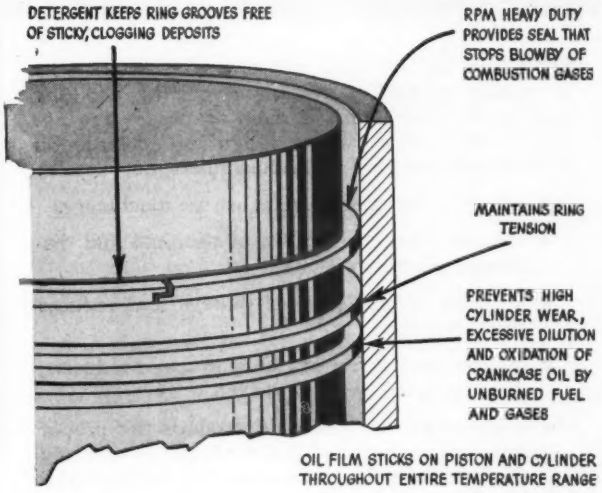
To prevent contamination, Standard Diesel Fuel is handled in separate pipelines, tankcars, trucks and containers. It comes free of grit and moisture, the principal causes of injection valve wear.

Standard Diesel Fuel flows freely and atomizes completely. It burns smoothly, producing maximum power in engines.

It is recommended for all Diesel engines except those requiring a special high-cetane fuel where Standard Locomotive Diesel Fuel and Standard Automotive Diesel Fuel are recommended.


Standard Diesel Fuel is specially stored and shipped to insure 100% cleanliness.
Has sufficient body to lubricate fuel pumps and other moving fuel-system parts.
Will not plug tiny injector openings or cause extra wear.
Atomizes completely.

Typical Injection Valve.


DETERGENT KEEPS RING GROOVES FREE OF STICKY, CLOGGING DEPOSITS
RPM HEAVY DUTY PROVIDES SEAL THAT STOPS BLOWBY OF COMBUSTION GASES
MAINTAINS RING TENSION
PREVENTS HIGH CYLINDER WEAR, EXCESSIVE DILUTION AND OXIDATION OF CRANKCASE OIL BY UNBURNED FUEL AND GASES
OIL FILM STICKS ON PISTON AND CYLINDER THROUGHOUT ENTIRE TEMPERATURE RANGE

Heavy-duty motor oil reduces cylinder wear

Many operators have eliminated stuck rings, blow-by and excessive cylinder wear by using RPM Heavy Duty Motor Oil.

This special heavy duty oil contains patented additives which remove sticky gum, carbon and lacquer from rings and ring grooves, keeping rings free so they can expand fully. With rings expanded, the tough lubricant film of RPM Heavy Duty Motor Oil forms a seal between rings and cylinder which prevents the force of combustion from driving gases and fuels down the walls.

RPM Heavy Duty Motor Oil sticks to metal at all operating temperatures. This assures unsurpassed lubrication at all times on surfaces of cylinders, pistons and rings, reducing wear to a minimum.

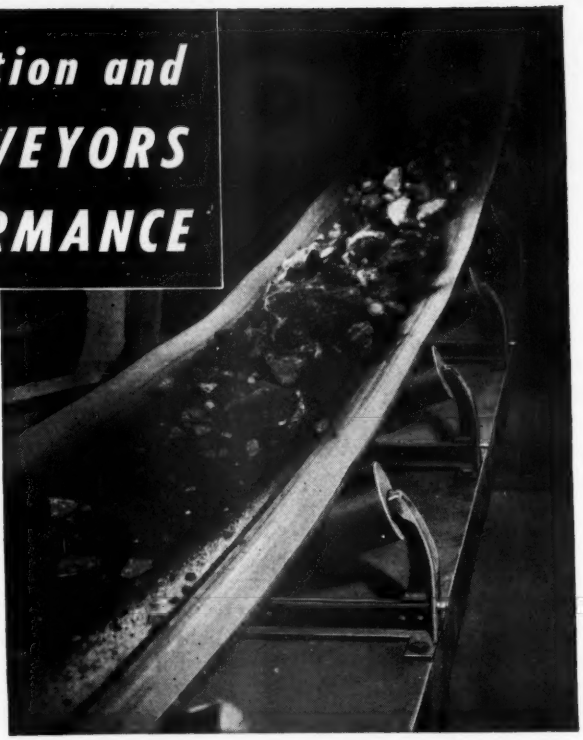
RPM Heavy Duty Motor Oil will resist sludge formation even in coldest operations, will not foam or corrode bearing metals.

Trademarks, "Calol," "RPM," Reg. U. S. Pat. Off.

For additional information and the name of your nearest Distributor, write Standard of California, 225 Bush Street, San Francisco 20, Calif.; The California Oil Company, 30 Rockefeller Plaza, New York 20, N. Y.; The California Company, 17th and Stout Streets, Denver 1, Colo.; Standard Oil Company of Texas, El Paso, Texas.

FOR EVERY NEED A STANDARD OF CALIFORNIA JOB-PROVED PRODUCT

How Engineering Selection and Design of BELT CONVEYORS Improve PERFORMANCE

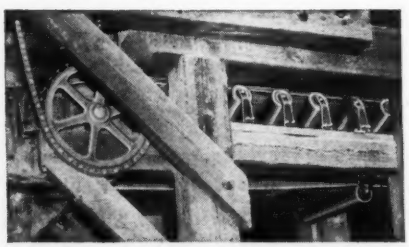


L-B belt conveyor carries magnesite ore from mine dump to crushing plant.

SUCCESS of Link-Belt belt conveyor installations in raising production rates and cutting handling costs, with a minimum of maintenance, is due not only to the most advanced design and construction of Link-Belt carrying and return idlers, but also to:

- properly designed terminal drive machinery.
- efficient discharge chutes at terminal and discharge points.
- a design of welded steel pulleys that reduces shaft deflection.
- highest mechanical efficiency in speed reducers, direct coupled or chain driven.
- engineering experience to produce the proper relationship between pulley diameter and ply thickness of belt; also between size of material handled and conveyor belt width, equality of rubber covering, carcass specifications, etc.

The user gets the benefit of this experience when he selects Link-Belt belt conveyor equipment—idlers, trippers, drives, pulleys, bearings, take-ups, belts.



• • • • •

Top, left: Drive end and discharge chute of L-B belt conveyor.

Center, left: L-B rubber tread idlers on return flight of belt, loosen and remove sticky material clinging to belt.

Bottom, left: L-B impact idler, giving cushioned support of belt at loading point. Greatly lessens wear on belt.

• • • • •

In the crushing, screening and preparation of iron ore, copper, nickel, molybdenum, bauxite, gold, silver and other ores, Link-Belt conveyors handle the material from one operation to the next. Belt conveyors carry the ore out of open-pit mines. Steel for ships, cars, buildings and its innumerable other uses is rolled, cast, formed, with the help of Link-Belt conveyor and drive chains. Bucket elevators, skip hoists, apron conveyors, belt conveyors handle coal, coke, ore, stone, on arrival at the mill. Consult Link-Belt specialists on any phase of conveying or mechanical power transmission.

LINK-BELT COMPANY 10,572A

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.

LINK-BELT
Conveyors
A TYPE FOR EVERY KIND OF MATERIALS HANDLING

Mining
CONGRESS JOURNAL

Published for the Entire Mining Industry by The American Mining Congress

JULIAN W. FEISS, Editor

Volume 33 JULY, 1947 Number 7

WHO IS THE BOSS?

LATE in June, Representative Howard W. Smith, one of the authors of the Smith-Connally Act, introduced a bill to renew the Government's power of seizure over strike-bound plants or industries. The anticipated crisis in coal, subsequent to the passage of the Taft-Hartley bill, has further accentuated demands from certain quarters that Government again assume control of coal production.

Temporary Government control of the American coal industry is no novelty. During five separate periods in recent years the coal mines of this nation have operated under the Federal Government. To some extent the emergncy, incident to war, may have justified this drastic step; few will argue to the contrary at times when national existence is the issue. However, our people do not favor nationalization of industry and they probably never will. Government seizure in wartime is tolerated as an emergency measure only. A renewed policy of Government control today trends directly toward nationalization, as has taken place in Britain and on the Continent.

Experience with Government seizure has shown labor leaders that it is a means whereby their demands—no matter how extreme—may be granted. Witness the coal industry. Knowing full well that the economics of coal mining under private ownership could not support excessive wage increases, John L. Lewis has used temporary Federal control as a means of attaining his objectives—at the expense of the consuming public.

The spectacle of the United States Government surrendering to the will of a labor leader is intolerable. Equally intolerable is the spectacle of a labor leader constantly thwarting the will of the nation. Despite the mandate of the people, as expressed by the passage of the Taft-Hartley labor law, organized labor is today challenging the orderly processes of government. Labor leaders have already stated that they intend to oppose the new law by every practical means. The question may well be asked: Who are the more powerful in our country, the labor bosses or the American people?

Our industrial structure cannot survive under conditions where ruthless labor leaders can successfully challenge the Government and the will of its citizens. If the Taft-Hartley bill has not provided adequate means whereby such men can be checked, our national labor laws should be strengthened with the object of curbing the monopolitistic powers of those in a position to wreck our American system.

OUR INDUSTRIAL FUTURE UNDERGROUND

SERIOUS thought is being devoted to the transference of critical industries underground in the event of a future atomic war. During World War II the Germans tried this experiment on a minor scale. The occupying armies found numerous subterranean installations, a few of them established in a most efficient manner. The Germans utilized abandoned mine workings and in some localities blasted caverns from solid rock to permit manufacturing operations free from the menace of air bombardment. Work on these underground projects was intensified during the last year of the war but in spite of such desperate defensive measures, the collapse of communications and the shattering of the transportation system brought the end in sight prior to the final defeat of the Nazi forces at the Rhine barrier.

Assuming that it were possible in the United States to move all munitions factories underground, would this drastic step guarantee security to these vital industries? If a large blast furnace could be installed secretly beneath the earth—a rather difficult project to say the least—how would iron ore, coke and limestone be brought to the furnace unless the connecting railways and highways were similarly protected? How would water haulage be handled on the Great Lakes—by submarines? It is true that pipe, powerlines and conveyors can be buried. However, such means are impractical for the handling of all types of raw or processed material over distances. Furthermore, plans would have to be made to protect the working population at these plants.

These problems may not be insurmountable and certainly our more critical munitions plants warrant every means of protection. However, this is only one minor phase in the overall picture of military defense and it is a passive one. Remember that "Maginot line mentality" did not protect France seven years ago.

Such defense could well be the fable of the ostrich. Germany would have been defeated irrespective of extensive subterranean installations; her populace could not have withstood the pounding from the air and her communications were already wrecked. Within a few months the atomic bomb would have been available for use over her cities and the results of this catastrophe are best left to the imagination.

We recall Oliver Cromwell who is credited with saying, "Trust in God and keep your powder dry."

Safety Pays Off At Eagle-Picher

It Has Taken 20 Years for Eagle-Picher to Attain Its Preeminent Position in Metal Mine Safety. Starting in the Tri-State During the Middle 1920's, with the Employment of a Single Safety Engineer Under Direction of the Insurance Department, the Program Has Expanded to Include Every Operational Activity of the Company. Today the Benefits of This Program are Reflected by Favorable Insurance Rates, Increased Production, Improved Labor Relations, Competent Workmen, and a Minimum of Lost Time Due to Accidents

By H. B. HUTCHENS
Director of Safety
Eagle-Picher Mining and Smelting Company

The author has been a member of the company's Safety Department since 1937 and Director of Safety since 1943.

TWENTY-ODD years ago, before organized safety made its appearance in the Tri-State District, it was considered the smart and fashionable thing for a drillman (there were then few dynamiters) to carry detonators loose in his pockets and crimp them onto fuses with his teeth as he needed them; for a shoveler to blast boulders out of his way at 8 o'clock in the morning, filling the mine for the rest of the day with dust and smoke; for a hoistman to cut 10 minutes off his working day by turning on all speed to get the crew out of the ground.

Today, at Eagle-Picher, not only are these once-traditional practices no longer fashionable, but any one of them, or those similarly unsafe and stupid, would cause a worker to lose his job immediately.

The reason for this is a safety department that allows no one—from superintendent to roustabout—to forget for a single day that Eagle-Picher has a safety program which aims to maintain certain standards of safe working conditions. It has proved such conditions advantageous to worker and owner alike through the 2½ decades it has functioned.

History and Organization

Departmental safety began at Eagle-Picher's Tri-State mines and mills in the middle 1920's, with the employment of a single safety engineer working under the direction of the insurance department. The company had shifted from premium to own-risk compensation insurance because of the exorbitant rates brought on by high accident frequency and severity and by the nefarious practice of malingering.

The greatest difficulties encountered in establishing an effective program was, as is probably universally true, in getting cooperation from foremen and workers. Fortunately the management stood squarely behind the new effort with a delegation of full authority for disciplinary action against all violators; otherwise it could not have survived.

The close relationship of safety to insurance and personnel is obvious in all well-organized companies, and at Eagle-Picher the three departments have grown up together so cooperatively and are so interdependent both in policy and personnel that rivalry or conflict of function is entirely absent. There is no doubt in the mind of any of these respective staff members that this close relationship has contributed to the efficiency of all three departments.

The safety department currently employs a chief engineer, two assistant engineers, a commissary and records clerk and an air hygiene engineer for control of noxious fumes and dust. Operating plants covered by the program are 30 mines, two mills, power and electrical service, surface rail and truck transportation, concentrates loading and other surface installations, and The Consolidated Supply Company, a subsidiary. There are approximately 1,500 workers in these plants.

Main Divisions of Work

Inspections are conducted at each plant at least once every two weeks, and may be as often as once a day if the danger of a situation warrants. They are made on a staggered schedule so that no foreman knows the exact time his operation will be visited. Each inspector usually covers two plant operations daily. An accompanying list sets out some of the subjects, both fire and accident, for routine safety examination on these daily tours of inspection.

Protection—the true measure of success of any safety program—is achieved at Eagle-Picher, first, by the department keeping good records, and second, by it exercising sufficient authority over operating personnel to translate the lessons of the records into policy.

Upon completion of a mine or plant inspection, the inspector fills out a report form which is signed in duplicate by the foreman. One copy is retained by the foreman for his guidance; the other is used by the inspector as a reference at the next inspection, subsequently becoming a part of the permanent records of the department.

Each hazard or violation is noted and acknowledged, and the details of its correction agreed upon between the foreman and the inspector. Corrective action, with relation to crew members, is always initiated by the foreman; never by a department representative. Discipline of a foreman

SUBJECTS FOR SAFETY INSPECTION

Fire Protection:
- Extinguishers and hoses
- Adequate water supply
- Grass hazards
- Stoves, heaters and flues
- Waste cans

Electrical Equipment:
- Proper grounds
- Switches
- General wiring

Hoists:
- Guards
- Brakes
- Cables
- Sheaves
- Snaphooks

Haulage:

Condition of tracks, cans and cars
Clearances
Speed

Loading:

Mist sprays and sprinklers

Trimming (Scaling):

Roof
Walls
Pillars

Explosives:

Transportation and storage
Lengths of fuses

Apparel:

Goggles, hard hats, electric cap lamps
Safety shoes or boots (all mine work)
Respirators, fresh-air masks (where required)

Housekeeping:

Change rooms and showers
Combustible materials
Mine debris

---

for violation or negligence of established safety practice (now an exceedingly rare occurrence) is administered by higher echelons of management, on the basis of inspection reports.

Besides the form inspection reports, each inspector keeps a journal of the details of his day's activities, whether they be routine plant inspections, emergency work, conducting visitors, or other assignments.

Injuries are cared for at a privately owned, central hospital located at Picher, Okla. Each mine or plant is equipped with a telephone, insuring rapid ambulance service in case of serious accident. Workers suffering minor injuries are transported to the hospital by their foremen, and are urged to report all injuries regardless of their apparent insignificance. Because of the quick availability of hospitalization and the danger of infection of open wounds caused by unhygienic treatment, medical first aid is not encouraged.

Accident investigations are conducted with two primary purposes in mind: first, and foremost, to learn what went wrong to cause the accident, so that corrective measures can be applied to prevent its recurrence; and second, to make a complete and exact record, including statements of all witnesses, to protect the insurance department in the event of subsequent claim litigation.

Air hygiene is a phase of safety which no mining company interested in the health of its employes can ignore.

Zinc and lead ores, which Eagle-Picher mine, are found in a highly siliceous gangue, making silicosis a serious health hazard. Consequently, dust control is one of the greatest concerns of the department.

The problem is being met by every practicable device and precautionary measure that modern safety engineering in general and the Air Hygiene Foundation of Pittsburgh in particular, have stamped with their seals of approval.

Routine dust counts from all points of exposure are in continuous process. These counts are conducted in a company laboratory by Mr. Burr Aton, an air hygiene engineer trained in taking air samples and analyzing them for impurities. His findings are recorded in detail and form the basis of all preventive action.

Water and ventilation are the two great enemies of dust concentrations. Fortunately, ventilation is largely taken care of by the nature of the ore-bearing area—by the wide stope-and-pillar workings, the interconnections of stopes, and the great number of shafts and churndrill outlets. Forced ventilation is seldom required, but is ordered by the department where need is indicated.

Water, in the form of fine mist spraying and heavier sprinkling, is used abundantly at such points of

Abundant use of water in allaying dust is one of the "musts" of Eagle-Picher's safety program

exposure as drilling, loading, transporting and crushing, where greatest hazard occurs.

It perhaps should be mentioned here that aluminum dust therapy for the relief and prevention of silicosis in Tri-State crews, including Eagle-Picher's, has been instituted at the Picher hospital under license from McIntyre Research, Ltd., of Canada, its founders. While it is yet too soon to assess conclusively the value of these treatments, enough employes have declared themselves benefited that the company feels well compensated for having made them available, and present plans are to continue them indefinitely.

Accommodation of visitors has become one of the chief functions of the department. The company's Commerce, Okla., mill is the largest zinc and lead concentrator in existence; it is therefore natural that technical visitors should come from the industry throughout the world. Also, the district is bisected by Highway 66, and because of its unique landscape of chatpiles it attracts many tourists who are curious to see the stopes that produced such mountains of waste rock. Finally, the company actively encourages tours through its mines and mills by those sincerely interested, believing such practice to be good public relations policy.

The job of overseeing and conducting these tours falls upon department personnel. On occasion, as many as 50 visitors at a time have been recorded in a visitors' register, provided with hard hats, battery lamps and other paraphernalia, and taken on the two- or three-hour excursion required to see the points of interest. An average of from 1,000 to 1,500 persons are accommodated this way each year.

Safety supplies, such as special hats, shoes, goggles, etc., are kept on hand at a company commissary and are furnished at cost to employes. Some items, such as ground-lens safety spectacles, which cannot, by reason of their nature, be kept in stock, may be ordered through the commissary. This system of supply is considered not primarily a convenience to the employes, but an essential function of the department, because of the better safety compliance it insures.

Annual meetings of the National Safety Council at Chicago, and the Air Hygiene Foundation at Pittsburgh, are attended regularly, and technically contributed to, by department engineers. The company has, for a good many years, maintained memberships in both organizations and has found such memberships to be helpful in keeping its safety program abreast of the times.

Eagle-Picher Innovations

Some of the devices peculiar to or originating in our own operations are shot-tubes, cap-protectors and aluminum ladders for roof-trimming (scaling down).

Two of these, the shot-tube and the cap-protector, were developed to meet the problem of reducing premature explosions, once the most productive source of serious accidents. The shot-tube is a cardboard cartridge just large enough to contain a single stick of dynamite with detonator and fuse, yet not too large to be slid through the drill bore. Its value lies in preventing crumpling of the "shot" and ramming the detonator. Its use in charging holes is compulsory.

The cap-protector is a small rubber jacket which covers the detonator and cushions it against friction or sudden jar. Its use is likewise compulsory in all blasting where shot-tubes are not feasible, such as "popping" boulders. These two devices, plus ordinary precautions in handling dynamite, have virtually eliminated premature explosions in our mines.

Because of their greater strength and lighter weight, aluminum ladders are the best answers so far provided for the problem of ascending to the 100-ft. heights necessary in some Eagle-Picher roof-trimming maneuvers.

The electric cap-lamp, while neither exclusive with nor originating in the department, should be mentioned here because it is now required lighting equipment for all workers in our mines. This lamp not only gives better vision, which is of extremely important though somewhat indirect safety value, but it has directly (1) completely eliminated old-time carbide and acetylene burns, and (2) reduced fire losses.

High ladder roof trimming is done with a special aluminum ladder which is five times as strong as its conventional phototype, yet weighs only half as much

The Foreman's Part in Safety

Accident records show that injuries occur largely because of human failure. Safeguarding machinery and equipment and removing obvious physical hazards are no more than manifestations of a company's willingness and desire to provide safe working conditions for its employes; they are by no means a complete safety program.

Perhaps the most important single phase of the work is winning the full cooperation of the foremen—establishing in their minds and habits a *safety consciousness.* Unless the foreman makes every possible effort to provide safe working conditions, encourages safe practices by precept and example, and displays an active safety leadership, it is not likely that workers under his supervision will pay much attention to safety.

The task of making and keeping Eagle-Picher foremen safety-conscious is accomplished in part by holding regular monthly foremen meetings. The purpose of these meetings is to give full discussion to common problems of production and company policy, including safety.

They are attended by top management of production and service departments — a factor which gives weight to the conclusions reached. All new safety features are introduced in these meetings and thoroughly explored for practicability before they are imposed on the operations. This, on the theory that no idea or policy is so good but that it can be improved by suggestions from persons who have to work with it daily in actual practice. Equally important is the opportunity which open discussion gives for full understanding of an idea or change of policy. No foreman reaches the "enforcement" stage of a new undertaking without a good working knowledge of what it's all about.

Foremen at Eagle-Picher are fully responsible, within their respective crews, for both safety indoctrination of new workers and disciplinary action against violators, although a new plan, whereby department personnel will take over the main task of general indoctrination of beginners, is currently under consideration.

If this plan is adopted, the foreman will be relieved of giving all but specific instruction in matters peculiar to his own place of operation. It will thus help him to eliminate one more distraction from his production duties, which are his primary concern.

Punishments for safety violation are usually reprimand, layoff or discharge, depending on the extent, significance and frequency by the individual offender. Punishments were strictly maintained throughout the recent war period, though in all fairness to our men, and in recognition of the spirit of patriotism which was so plainly obvious among them, it must be said there was then less inclination to ignore or disobey safety rules than ever before in the history of the department.

An added inducement to gain the cooperation of the foreman is the no-lost-time accident bonus. Foremen who take their crews through the month without a lost-time accident receive a cash bonus of one cent per manshift. If they go 12 consecutive months, they receive an additional $25. Records show that there is an approximate 80 per cent participation in the monthly bonus, and one foreman has operated his mine six consecutive years, for a total of more than 400,000 man-hours, without a lost-time accident.

The department, with the cooperation of top management, has succeeded in instilling in foremen a peculiar pride in making this monthly honor roll—a pride which perhaps is even more of an incentive than the few dollars the distinction brings.

There is no greater formula for winning cooperation in a joint undertaking such as a comprehensive safety program than recognizing and rewarding the efforts and accomplishments of those who contribute to its success. That is the basis of the no-lost-time accident bonus plan at Eagle-Picher mines.

Safety's Pay-off

The benefits of a safety program are now well recognized in our operations and throughout the Tri-State District, but it is only those of us whose industrial experience goes back a quarter of a century—those of us that grew up in a tradition of flagrant and deplorable non-safety—who can appreciate the full significance of these benefits.

For the workers, who, beyond any dispute, receive the greatest of these benefits, there are the saving of life and limb, of health and the self-respect and independence which comes of having escaped being an industrial cripple, a fate suffered by so many of their fathers and older brothers in the careless "good old days" before organized safety appeared.

For the owners and management, there are (1) a consistent financial saving in insurance rates, (2) assurance of the "cream of the crop" in competent workmen, (3) increased production efficiency, (4) improved labor relations, and (5) the personal satisfaction that comes of being *progressive*—of filling a social and economic vacuum with worthwhile achievement.

An air view of Meteor Crater near Winslow, Ariz. Recently attention has been focused on new mining developments at the crater. Mining Congress Journal will carry the account of these new operations in a forthcoming issue

Time Studies To Improve Mechanical Operation

Summarizing the Time Consumed and Delays in Specific Operations, This Study is Useful in Planning Changes to Improve Production of Existing Units and in Designing New Mining Methods

★

DAVID R. MITCHELL
Head, Department of Mineral Engineering
and
RICHARD L. ASH
Research Assistant, Division of Mining
The Pennsylvania State College

★

MEMBERS of the staff of the Division of Mining of The Pennsylvania State College are currently making an engineering study of shuttle car gathering. As part of this study detailed time and method studies have been made at a number of coal mines throughout the United States. Not a sufficient number of field studies have been analyzed in the office to develop conclusively trends and characteristics for the various conditions encountered in operating shuttle car production units. This paper is in the nature of a progress report and the summation data presented herein must be appraised on that basis.

Time studies are useful in determining the characteristics of a particular method of doing work, and for determining deficiencies in production cycles. If properly utilized they furnish the factual information necessary to develop methods for improving the performance of machines, men, and production units.

Time Study Method

Since the characteristics of individual machines and production units as a whole are being studied, time studies of the loading machine and the shuttle cars in the production unit are made. This is usually done by stationing one man at the loading machine and one at the discharge station. The symbols used and their specific meanings are given in the following table.

Time-element symbols are formed by combining letters each of which has a specific meaning. For instance, the letter *T* always means *travel* except when used in the beginning of a three-letter summation where it means *total.* Certain other letters have different meanings when used in combinations than when used alone. The general rule is that the relative position of a letter within a symbol determines the specific meaning of a letter. *D* alone means *discharging.* When used as the first letter in a two-letter symbol it always means *delay;* when used as the second letter it means *discharge.* For delays at the discharge station *S* is used to mean *delay* instead of *D* in two-letter combinations.

When field studies are completed for any one producing unit, results are computed and subsequently an analysis is made. The preliminary procedure is to calculate the working times consumed by each separate time element, and then group these working times into useful totals. The totals are designed to include all related items. For example, Total Trip Time (TKZ) includes all times engaged in productive effort by the shuttle car. Delay times are grouped according to similar categories, e.g., those occurring at the discharge station, those occurring during traveling, and those due to natural conditions. Using these totals, a graphic chart on a working place basis is constructed. Percentages on the basis of the entire time of study are also determined and charts constructed.

Proper interpretation of study results requires a thorough knowledge of the conditions under which a machine operates. The ideal condition is when all machines, both haulage and loading, are working continuously without delays.

Inefficient and poorly coordinated units are manifested by large delay times specifically shown by the individual time elements. Poor mining methods are shown by unusually large time values for either PC, M, DL, or DP. Adverse mining conditions are indicated by the large time spent in DT, DL, PC, and DN, and to TE and TL when tonnages are low. Large time values for WO, WQ, CC, and DS show poor coordination. A large time consumption for DM is indicative of faulty equipment or poor maintenance practices.

From the observation of both time and method studies specific faults in the operation may be recognized. For example, large TE and TL values when production is low indicate poor roadway maintenance, too long haul distances, adverse mining conditions or poor operators. The cause which is most dominant is determined by correlation with other time values and knowledge of the conditions of operation. A poor haulage machine operator is confirmed by relatively large HC, D and DO values in addition to slow speeds. In general, a poor loading machine operator gives large M, HC, DL and DO time values. Distances from the working face to the discharge station that are too long always produce excessive CC values, and in some cases, above normal CC times result from the utilization of too few haulage machines per loading unit.

Studies at Mine

At this mine production units of single cable cars are used for driving entries and production units of two battery cars for room work. Details of the shuttle car and loading machine time studies for one of the cable car units and for one of the battery car units are given.

The mine is classified as non-gassy and dry, with fair bottom, and with roof conditions that vary from bad to good. Elevating conveyors are used at all discharge stations. The coal seam is 6 ft. and dips less than 1 per cent. Rooms are driven at an angle to the entries and are 32 ft. wide and 300 ft. long. The entries are 10 ft. wide. Considerable timbering is necessary to hold a friable shale roof.

Two Battery Car Section

One shuttle car and one loading machine study were made, both being at different times. The shuttle car and loading machine time study charts are given in Figures 1 and 2.

The loading machine is rated at 2 t.p.m. of coal. The capacity of the shuttle car is six tons and the mine car, six tons.

TIME STUDY SYMBOL SYSTEM

Symbol	Meaning
A	AT
B	Battery, Belt, Bottom
C	Cable, Car, Car Spotting, Change
D	Discharge, Delay
E	Empties, Empty
F	Failure, Breakdown
G	Gas
H	Hauling, Handling, Hanging
I	Timbering
K	Trip
L	Loading, Loading Machine
M	Maneuvering, Mechanical
N	Natural Conditions, Necessary
O	Other, Other Shuttle Car
P	Main Power, Place, Preparation, Prepare to
Q	Other Equipment
R	Roof
S	Discharge Station, Shuttle Car, Supplies
T	Total, Traveling
U	Unnecessary
V	Ventilation
W	Wait for
Y	Shift
Z	Time
CB	Changing Batteries
CC	Change Car Time
DB	Delay Due to Bottom
DO	Delay Due to Other Reasons Not Listed
DP	Delay Due to Face Preparation
DR	Delay Due to Roof
DV	Delay Due to Ventilation
FB	Failure of Battery
FC	Breakdown of Cable
FL	Breakdown of Loading Machine
FO	Breakdown of Other Shuttle Car
FP	Failure of Power
FQ	Breakdown of Other Equipment
FS	Breakdown of Shuttle Car
GR	Testing for Gas and Bad Roof
HC	Handling Cable
HS	Hauling Supplies
LU	Lubricate and Inspect Machine
OL	Other Delays in Loading
PC	Place Change
PD	Prepare to Discharge
PT	Prepare to Travel
SB	Delay Due to Belt Stoppage at Discharge Station
SC	Delay Due to Car Spotting at Discharge Station
SE	Delay Due to No Mine Cars at Discharge Station
SO	Other Delays at Discharge Station
TE	Traveling Empty
TL	Traveling Loaded
WO	Wait for Other Shuttle Car to Load and Pass
WQ	Wait for Other Equipment to Pass
TCC	Total Change Car Time
TDS	Total Delays at Discharge Station
TDM	Total Delays Due to Mechanical Causes
TDN	Total Delays Due to Natural Conditions
TDO	Total Delays Due to Other Reasons
TDL	Total Delays in Loading
TDT	Total Delays in Traveling
TLZ	Total Loading Time
TLO	Total Load-Out Time
TND	Total Necessary Delays
TPC	Total Place Change Time
TAL	Total Time at Loading Machine
TUD	Total Unnecessary Delays
TKZ	Total Trip Time
TYZ	Total Shift Time

The shuttle car studied was characterized by uniformity in operation, high efficiency and a high production of 190 tons. Forty-five per cent of the shift was spent in actual production. Large loss times were as follows: delays from mechanical causes (DM), 12 per cent; delays while waiting for the other car to load and pass (WO), 9 per cent; hauling supplies (HS), 8 per cent; place change delays (PC), almost 7 per cent; and delays due to other reasons (DO), over 7 per cent of the total shift time. Other delay times included a 4 per cent time loss from loading delays (DL), and a total of 3 per cent of the shift spent waiting for other equipment to pass (WQ) and no preparation (DP).

Mechanical delays resulted from a 24-minute power failure, and a 28-minute loading machine breakdown, during which time the shuttle cars changed batteries. Waiting time was fairly consistent in occurrence and was partially the result of the long distances from working faces to standby positions. The delays attributed to DO time included a 20-minute lunch period and a 12-minute early quit. The delays at the discharge station were primarily because of no mine cars. Loading delays were present because of place cleaning, and the WQ time loss was from waiting for the cutting machine to pass.

Seventy-six per cent of the six-ton rated capacity of the shuttle car was used. Travel speeds were fast, averaging 340 f.p.m. loaded and 330 f.p.m. empty. Discharge and loading rates per ton were low. The high tonnage per shift evidenced an efficiently operated machine, resulting from a good operator, a suitable mining system, and suitability of the equipment for the work required.

The loading machine study was also characterized by uniformity in operation, high production and high efficiency, although only 39.7 per cent of the shift was used in production. The largest delay was change car time (CC), which used almost 38 per cent of the shift. Approximately 7 per cent of shift time was consumed by DL, DO and PC. Only 1.5 per cent of the shift was lost to delays from mechanical causes (DM), and delays in preparation (DP) did not occur.

The primary cause for the large total change car time was because of no mine-car periods at the discharge station, of which there were four. Estimating that the average change car time was 1.5 min. per shuttle-car trip, the time lost because of no mine cars is 70 minutes, or 40 per cent of the total change car time. As shown in the shuttle car study for WO times, the long distances from the working faces to shuttle car standby positions caused large change car times when loading in certain rooms.

The time used for delays in loading was one-third composed of time spent in timbering. The remaining time was used in cleaning each place before changing places. Delays due to other reasons included a 25-minute lunch period and an early quit of 7 minutes. The large place change time was due principally to cable handling, accounting for one-third of the place change time.

Loading machine output was at the rate of 111 tons per loader hour which is close to rated capacity and indicates the suitability of the loading machine for the work.

Entry Driving, Single Cable Car

A shuttle car study and a loading machine study were taken simultaneously. Time study charts are given in Figures 3 and 4. The loading machine is rated at 2 t.p.m., the shuttle car at five tons and the mine car, six tons.

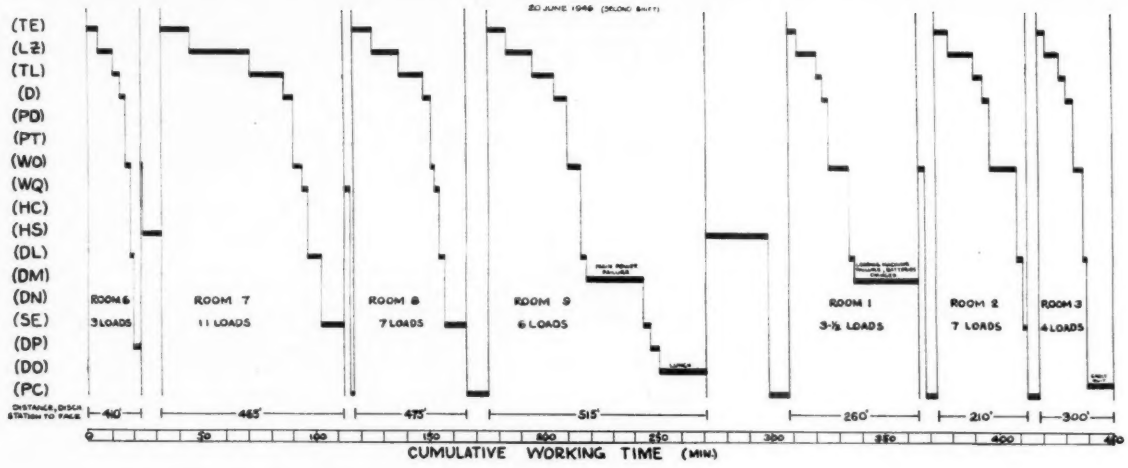


Fig. 1. TIME STUDY CHART OF SHUTTLE CAR—Two shuttle cars with mechanical loader

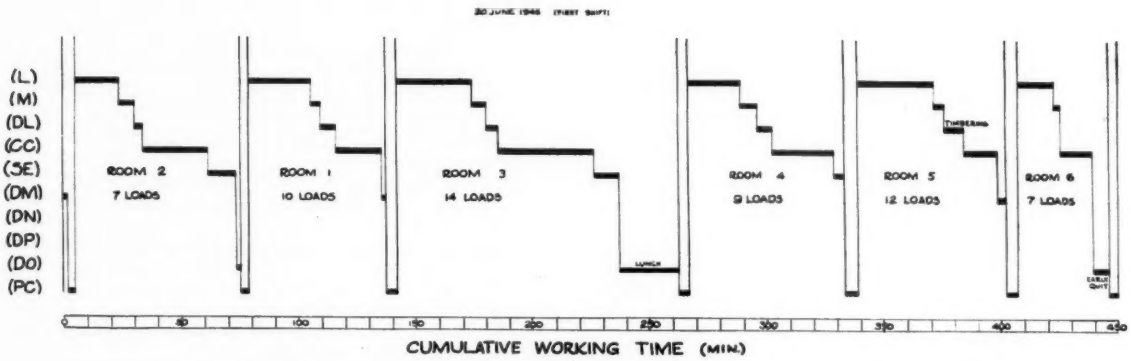


Fig. 2. TIME STUDY CHART OF LOADING MACHINE—Two shuttle cars with mechanical loader

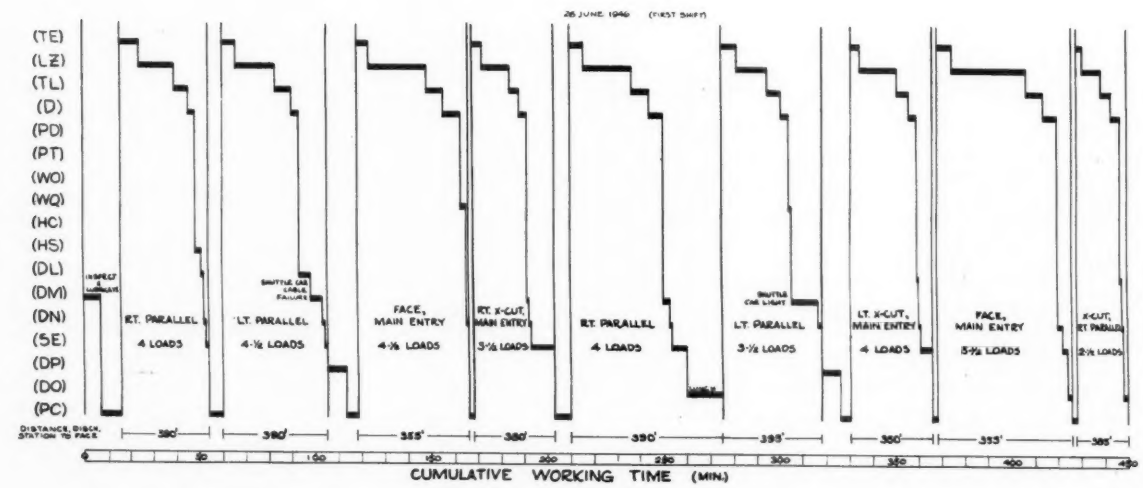


Fig. 3. TIME STUDY CHART OF SHUTTLE CAR—One shuttle car with mechanical loader

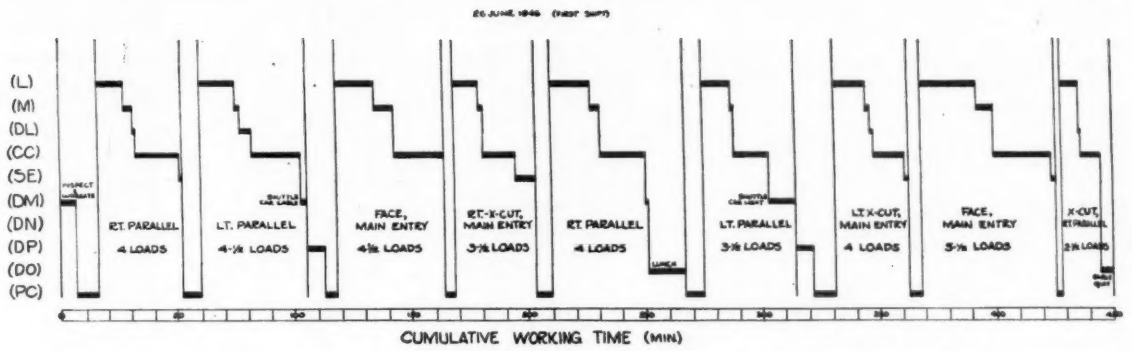


Fig. 4. TIME STUDY CHART OF LOADING MACHINE—Entry driving with one shuttle and one loading machine

The shuttle car was engaged in productive effort for over 67 per cent of the entire shift. But many delays were encountered, including mechanical (DM) and discharge station (DS) delays, each of which caused 6 per cent loss of total shift time. Other delays consuming a total of 18 per cent of the shift included place change time (PC), waiting for coal preparation (DP), delays due to other reasons (DO), and delays from natural conditions (DN). Delays in loading (DL) used 1.6 per cent. Hauling supplies (HS) and waiting for other equipment to pass (WQ) each used less than 1 per cent of total shift time.

Delays from mechanical causes were composed of a 7-minute lubrication period, a total of 16 minutes of shuttle car failures, and 4 minutes lost time because of low power. Over three-fourths of the discharge station delays were because of no mine cars, the remainder of which resulted from delays in the starting and stopping of the elevating conveyor. Close timbering in the entries imposed slow loading machine travel, causing large place change times. No preparation occurred twice during the shift, both times during place changes and each causing 8-minute delays to the shuttle car. Lunch time for 16 minutes and a 2-minute early quit constituted DO time delays. Time losses due to natural conditions occurred during every shuttle car trip. Each time was very small, however, and was caused by the shuttle car operator having to stop and open ventilation doors.

One hundred fifty tons were hauled during the time of this study. Shuttle car travel loaded speed was not high, 268 f.p.m. The loading time rate per ton was slow, particularly due to the maneuvering of the loading machine, which comprised over 17 per cent of the total loading time. This car was operated at the rate of 91 ton-miles per hour, which is higher than average. Ninety-four per cent of rated capacity was used. Contributing factors to the efficiency included the definite suitability of the equipment and a good operator. The corresponding loading machine study as shown by Figure 4 indicates a low loading-machine efficiency in comparison with the shuttle car. Approximately 40 per cent of the shift was lost to change car time (CC), and only 35.5 per cent was available for production,

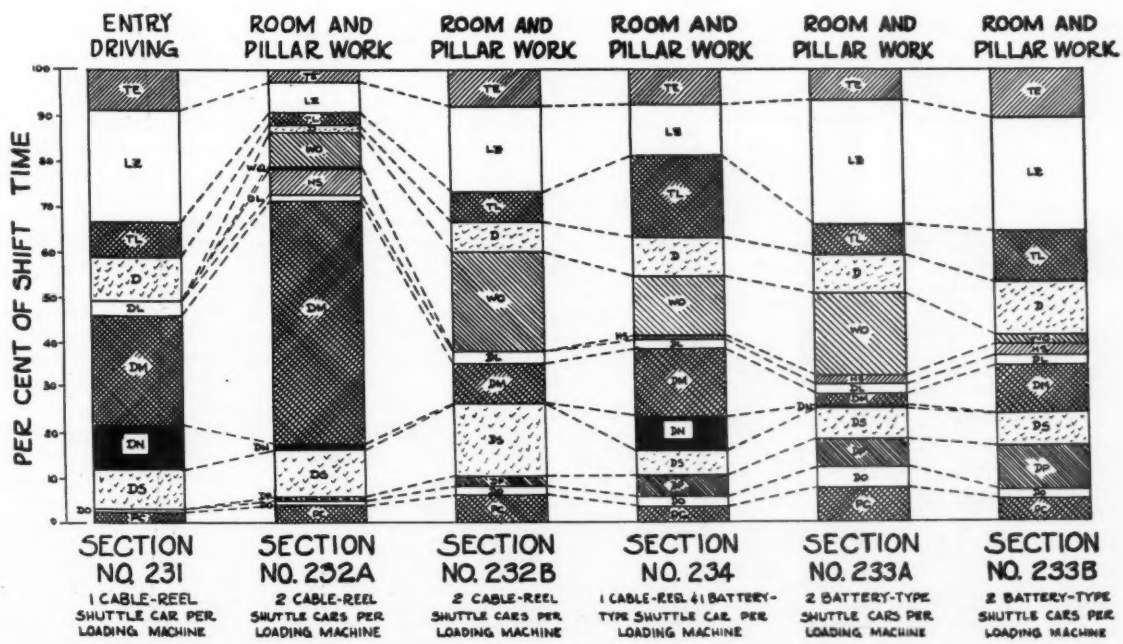

ENTRY DRIVING
ROOM AND PILLAR WORK
ROOM AND PILLAR WORK
ROOM AND PILLAR WORK
ROOM AND PILLAR WORK
ROOM AND PILLAR WORK
PER CENT OF SHIFT TIME
SECTION NO. 231
1 CABLE-REEL SHUTTLE CAR PER LOADING MACHINE
SECTION NO. 232A
2 CABLE-REEL SHUTTLE CARS PER LOADING MACHINE
SECTION NO. 232B
2 CABLE-REEL SHUTTLE CARS PER LOADING MACHINE
SECTION NO. 234
1 CABLE-REEL & 1 BATTERY-TYPE SHUTTLE CAR PER LOADING MACHINE
SECTION NO. 233A
2 BATTERY-TYPE SHUTTLE CARS PER LOADING MACHINE
SECTION NO. 233B
2 BATTERY-TYPE SHUTTLE CARS PER LOADING MACHINE

Fig. 5. Comparison of shuttle car time studies

of which one-sixth was used in maneuvering. Over 12 per cent of the shift was absorbed by place change time (PC). Delays because of no preparation (DP) used 5.6 per cent while delays from other reasons (DO) consumed over 4 per cent of the shift. Loading (DL) and mechanically caused (DM) delays consumed approximately 2 per cent of the total shift time.

The large place change time, an average of 5.5 minutes per place, was directly the result of close timbering. Two 8-minute delays composed no-preparation lost time, and the delays due to other reasons included a 16-minute lunch period and an early quit time of almost 5 minutes. Change car time, the greatest consumer of time losses, was the result of a 16-minute loss from shuttle car breakdowns, of over 19 minutes lost because of no mine cars at the discharge station, and the long distance between working faces and the discharge station.

The loading machine operated at the rate of 65 tons per loader hour, which is only 54 per cent of the rated capacity of 2 t.p.m. of the machine. The low percentage of loading delays excluded mining conditions as the major factor for a low output rate although mining conditions did contribute to the difficulty of loading. The major cause would appear to be a poor operator.

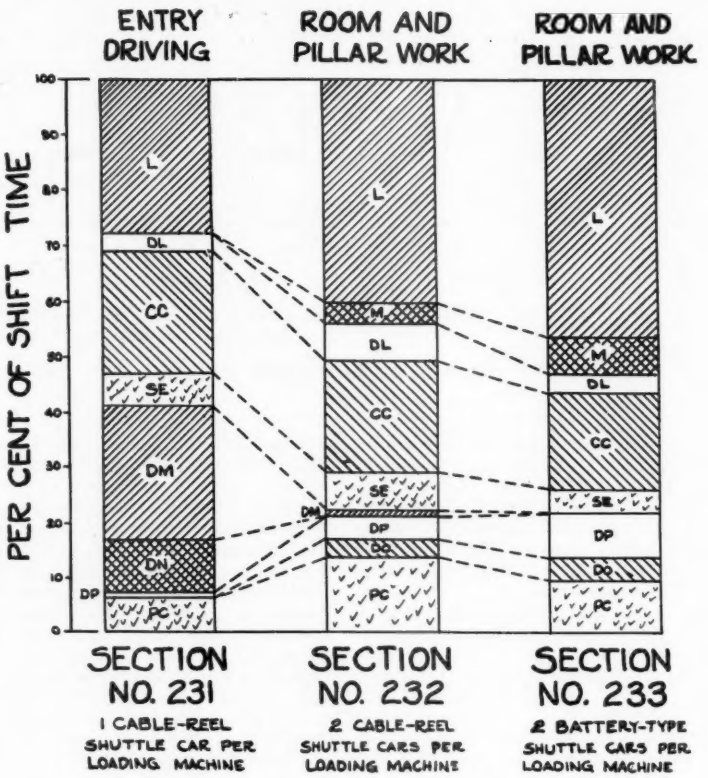


Fig. 6. Comparison of loading machine time studies

Summation of Studies

Both cable reel and battery powered cars in various combinations are used at this mine. The loading machines have a rated capacity of coal of 5 t.p.m.; the cable reel cars, 3.5 tons; and the battery powered cars, 6 tons. Mine cars are rated at 3 tons.

Mining conditions are difficult, requiring close timbering. Entries are 12 ft. wide and rooms 24 ft. wide. Three rows of posts on 12-ft. centers are carried in the rooms. The coal seam averages 64 in. thick. The bottom is hard but wet, and the pitch is less than 1 per cent.

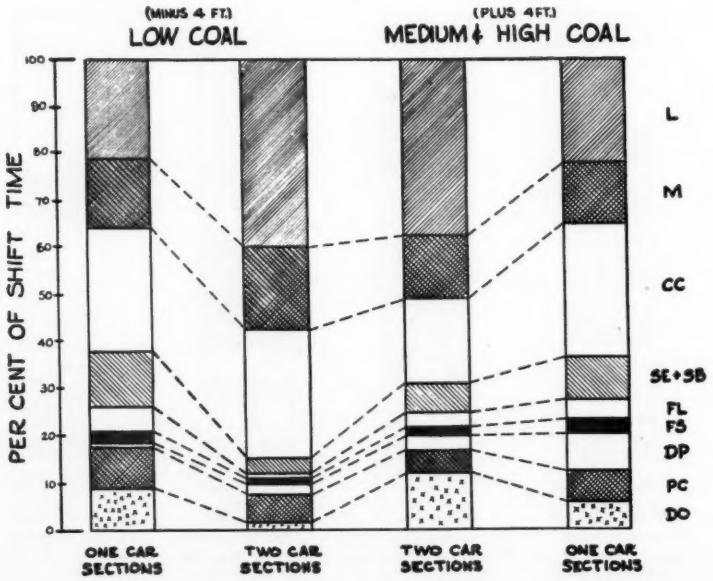


Fig. 7. Average characteristics of shuttle car operations as shown by loading machine time studies

Six shuttle car time studies were made as given in Figure 5, and are for one car in a production unit. For section 234, using one cable-reel and one battery car, the time study was made on the cable-reel car.

The studies give the overall characteristics of shuttle car operation at this mine. Much of the equipment was old, war weary and hence mechanical and electrical (DM) delays consumed a high percentage of total shift time. The battery-powered shuttle cars were four years old; the cable-reel shuttle cars were new.

Three loading machine studies were made as shown in Figure 6. The relative increase in loading time of two-car production units as compared to the one-car unit is characteristic of the production units in this mine.

Loading machine time studies at a number of mines were averaged to get the data for Figure 7 giving the average time consumed for one shuttle car and for two shuttle car production units.

HOW TO BRING DOWN TWO "OVERHEADS" AT ONCE

Drilling smoothly and easily into the hardest rock, this Blue Brute Stoper is cutting down maintenance costs at the same time. It's the new, self-rotating WR-31 — a fast, tireless performer that will do a lot of heavy drilling for you on very little air.

From end to end the WR-31 is crammed with new design improvements. For instance, the ratcheted rifle bar engages four air-operated pawls on the piston's backstroke. There's positive action here, with extra solid, longer lasting construction — and it's exclusively Worthington!

That proper position of the holding handle — *above* the centre of gravity for better balance — will make a big hit with your runners. They'll like the shielded, down-directed exhaust and the air and water tube construction which insures a constant air stream that keeps sludge and water out of the shielded type chuck.

Men who use stopers *know* stopers— and you'll save money by giving them equipment that combines easy handling with tops in efficiency. How about letting them get the "feel" of the new WR-31 in an easily arranged demonstration? Watching this speedy, economical Blue Brute in action will prove to you, that *there's more worth in a Blue Brute.*

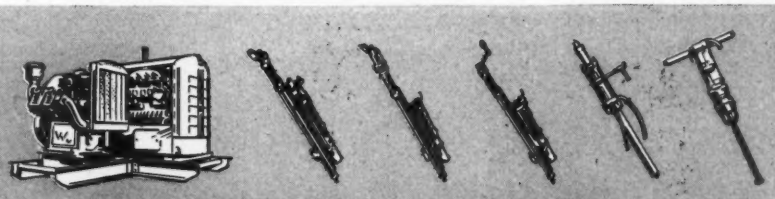
Write for literature describing the complete line of BLUE BRUTE Mining Equipment, including Drifters, Stopers and Hand Drills.

BLUE BRUTE DRIFTERS

Types WPM (Pneu-Motor Incorporated in Drifter), WPMS (Pneu-Motor on Shell), and WHC (Hand Crank). Featuring the new, *balanced* design for faster drilling cycles and all-around operating economy.

BUY BLUE BRUTES

H7-11



Semi-Portable Compressors. Drifters with Feed Motor Incorporated. Drifters with Feed Motor on Shell. Hand-Crank Drifters. Stopers. Hand-Held Rock Drills.

WORTHINGTON

Worthington Pump and Machinery Corporation. Worthington-Ransome Construction Equipment Division Holyoke, Mass.

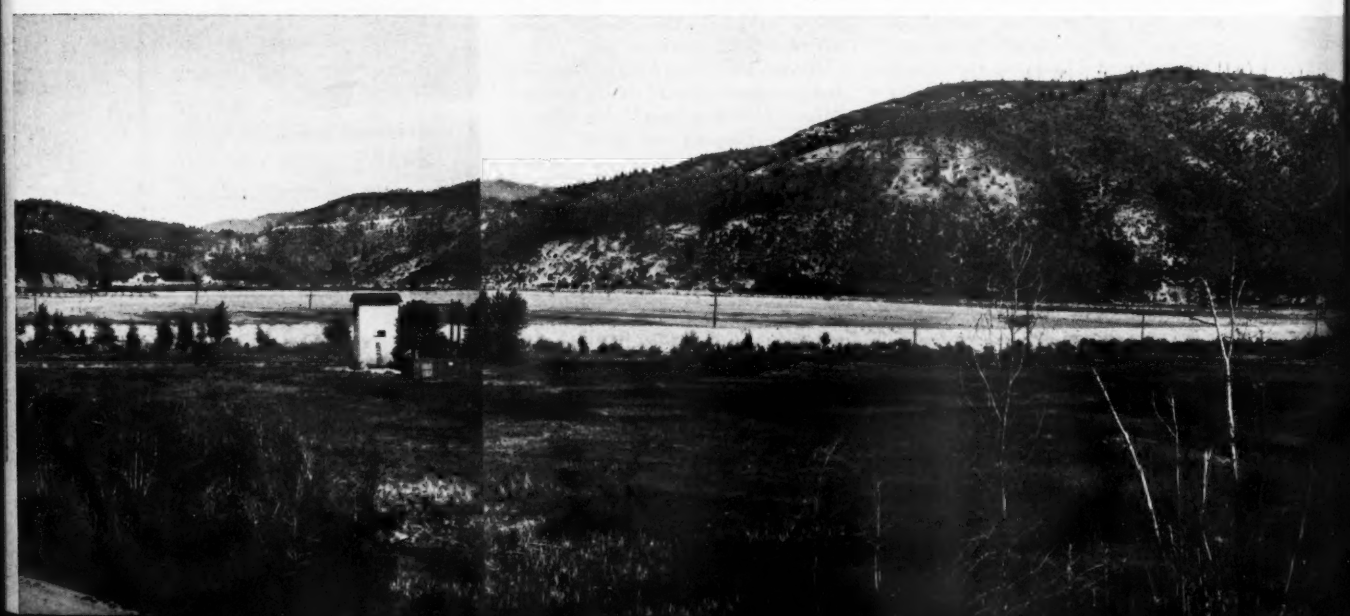
A pond is constructed to allow settling down stream from a dredge at Yankee Fork

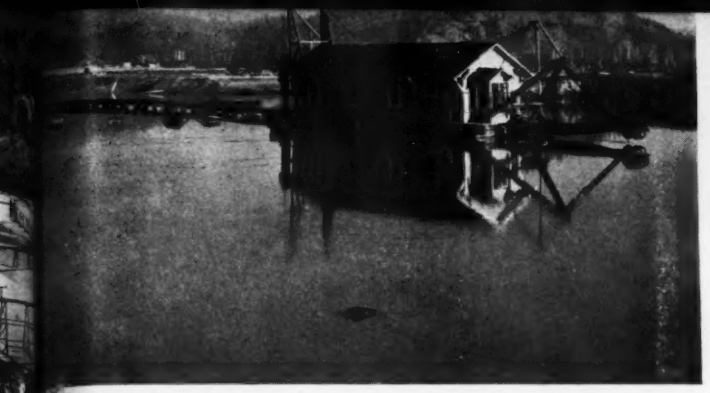
The Triumph Mining Co. stacks its tailings so efficiently that trout are caught where the clear overflow enters the stream

Stream Pollution Control In Idaho

THE problems of pollution control from mill tailings in Idaho have by no means been simple to solve. In this mountainous area such control requires ingenuity and clever engineering. Although Idaho mine operators do not claim perfection, they have achieved results without a Federal law and through local cooperation. More important—this work has not been a burden on the nation's taxpayer.

Only clear water is discharged from this settling pond. A panorama of the tailings disposal project of the Page Mill, Federal Mining Co.





At the Cataldo suction dredge on the Coeur d'Alene River, approximately 18,000,000 cubic yards of material have been pumped from the settling pond

Discharge from the Cataldo dredge is on high ground. Only settled wat is discharged to overflow

Above: Only clear water discharges from the mill tailings of the Bunker Hill and Sullivan operations

•

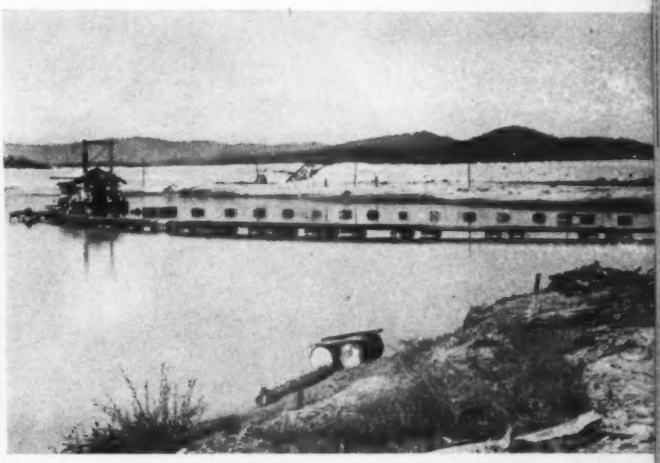
Right: Tailings are carefully stacked at the Osburn tailings mill of the Hecla Mining Co.

•

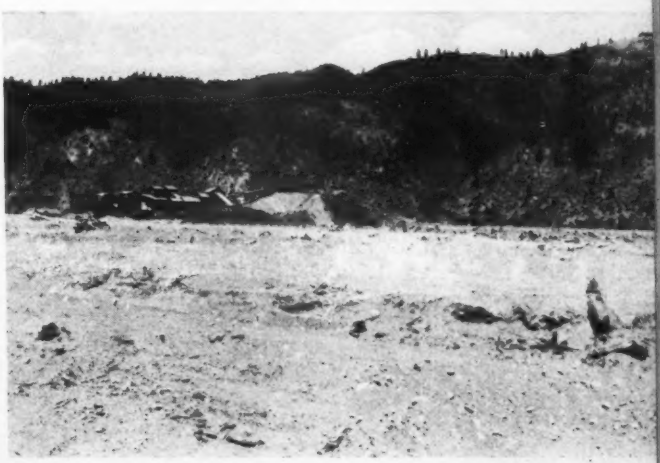
Lower right: This area will impound 12,000,000 tons of tailings on the first lift

•

Below: The Clayton Silver Lead Mining Co. has done an unusually efficient job of stacking tailings



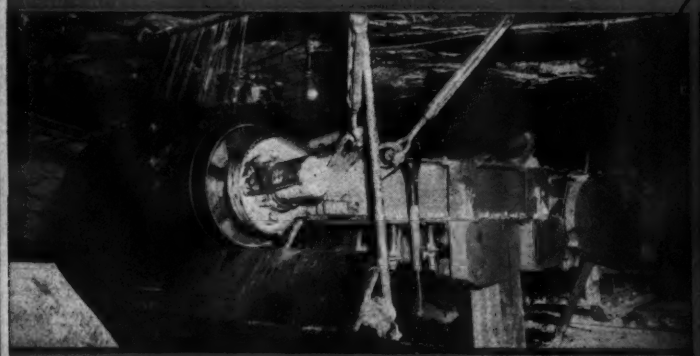
Suction dredge pumps tailings to high ground



THE CENTER OF

JOY LOADERS

La-Del Shaker Conveyor



Joy and La-Del Conveyors

Joy Shuttle Cars

JOY MANUFACTURING COMPANY

General Offices: Henry W. Oliver Bldg., Pittsburgh, Pennsylvania

PRODUCTION
in Trackless Coal Mining

Joy Equipment makes higher tonnage and lower costs possible

Sullivan 7-B Cutter with Bugduster

Sullivan 10 RU Cutter
Licensed under the patents to E. C. Morgan, 1,953,385.

Sullivan Silver Streak Rock Drills

"The World's Most Complete Line of Mining Equipment"

Consult a Joy Engineer

An Experiment With Tungsten Carbide Bits

Although tungsten carbide may not entirely replace bort and diamond when drilling highly siliceous and abrasive ground, these bits may prove economical in softer rocks, especially when used at high rotational speeds. The experiments of the North Range Mining Co. indicate economy from the use of tungsten carbide bits; under conditions where no chert or hard rock is encountered, 100 to 150 ft. of iron ore can be drilled without resharpening.

By C. W. NICOLSON
Manager
North Range Mining Co.

IN the spring of 1946 the North Range Mining Company, at its Book Mine, located near Crystal Falls, Mich., began the drilling of long blast holes for mining in underground stopes. The ore at this property is classed as a soft hematite and can be drilled with auger steel in a jackhammer. However, it is sufficiently firm to stand in unsupported stopes as much as 100 ft. in width and it will maintain benches when mining by the standard method of sub-level stoping. The ore itself is not particularly abrasive but there occur, at random throughout the ore, layers of the wall rock, locally known as jasper and consisting essentially of bands of chert. The orebodies are extremely irregular in shape and have been formed by the repetition, sometimes through faulting but usually through extremely tight folding, of a layer or horizon of ore having a thickness of about 50 ft. The repetition of this horizon produces orebodies having apparent widths of from 100 to 400 ft. In this intense deformation, layers of the jasper have been folded into the orebody but neither the location nor the extent of these jasper layers can be predicted.

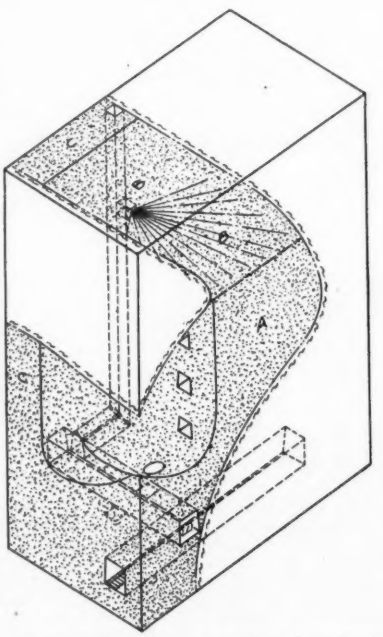
Prior to 1946, the standard method of sub-level stoping was employed. Where the orebody was too wide to be removed in a single stope, parallel stopes each 70 ft. in width were opened, leaving pillars 25 ft. wide between the stopes. Sub-levels at vertical intervals of 20 ft. were driven through the ore to be mined and after the initial slot had been opened to the full height of the orebody, benches were carried on the vertical ore face to the full width of the stope and the ore mined by drilling holes both up and down from the various benches. The broken ore fell through mills to the scraping sub-level and was scraped to the raise leading to the haulage level.

Long-Hole Blasting Tried

After the long-hole method of blasting was adopted, the same sub-level stoping method was employed in some stopes using vertical rings of radiating drill holes from sub-levels which were spaced 40 ft. apart vertically. In such stopes, the longest drill holes are approximately 60 ft. In other stopes, horizontal rings of radiating drill holes are used, the longest holes being about 70 ft. This is a form of overhand stoping, differing from shrinkage stoping in that the ore is drawn off as broken and the stope is usually empty.

The drills used in this work are Sullivan HS-15 machines which can be operated at a maximum speed of 3500 r.p.m. and with four different rates of advance, varying from 200 to 600 revolutions per inch of advance. The first bits used were bort bits in the EX size. Non-coring bits both of the concave and pilot type were first tried. This type of bit was very satisfactory when drilling in ore but if any layers of rock were encountered, the bit wore so rapidly that progress of even one inch made it necessary to retire the bit from service. The standard coring bits were then tried. It was found that practically the same rate of advance could be maintained as with the non-coring bits and that, probably due to the high r.p.m. and the high water pressure, practically no core was produced.

The drill is capable of a rate of advance of 17 in. per minute and it was found that in ore such a rate could be attained for short periods. On the whole, however, it was found that a rate of about 20 ft. per hour was the most that could be expected. If holes could be kept entirely in ore without touching any rock, it was found that a life of 400 ft. could be obtained from these bort bits, but if, as usually happens, a layer of rock were encountered, the bit might be ruined after only a few feet of travel. The bit cost was determined to range from 30 cents to 60 cents per foot with an average cost of about 50



A—Ore block being mined by sub-level stoping
B—Ore block to be mined by horizontal blast holes
C—Pillar between stopes

cents. Using the EX bits, an average production of four tons per foot of hole could be obtained.

The First Experiment

The high cost of bort led to experiments with coring bits, the cutting edges of which were made of tungsten carbide. These bits are manufactured by Kennametal, Inc., of Latrobe, Pa., and were developed for use in coal mining districts. The shape of the bits is shown on the photographs, a rectangular segment of tungsten carbide being brazed into the leading edge of each tooth, of which there are six in the EX size and eight in the AX. The photographs show, from left to right, a new bit; a bit after the first grinding and a bit ready for discard after having been ground six times. When operating in ore entirely free from any rock, 100 to 150 ft. can be drilled before it is necessary to sharpen the bit by grinding and six grindings can always be expected. This gives a life per bit of from 600 to 900 ft. of hole. This bit will drill through rock at a considerably lower cost than with bort bits but in chert it wears very rapidly and would probably have to be reground after drilling 2 to 3 ft. of solid chert. The bit can be reground under these conditions five to six times, but it cannot be recommended for continuous use in rock of this character. The bit, however, will pass through thin layers of rock 1 to 2 in. in thickness without showing excessive wear and it can be used with considerable economy when drilling through softer rocks such as slate or soft igneous dikes.

As a result of drilling into random inclusions of chert, the life of individual bits has varied greatly. However, taking all the bits which have been used at this property against the total footage drilled, an average life of about 350 ft. has been obtained, with an average bit cost of less than four cents per foot.

High Rotation Speeds Required

It has been our experience that this type of bit must be run at a very high rotative speed. With speed of 1800 r.p.m. or less the bit chatters and a heavy vibration is set up in the rods. Under such conditions, the bit drills a hole much larger in diameter than normal and the rate of advance is very slow. Using speeds of 3000 to 3500 r.p.m. the bit drills very smoothly making a hole about 1½ in. in diameter or about 1/16 in. larger than the bit itself. In ore, the bit will drill as fast as the rods can be advanced, or with the Sullivan drill at the rate of 17 in. per minute. We believe that the bit would cut even faster than this if a machine were used capable of faster advance rates. No core is produced by this bit when drilling in ore and only occasionally is a small piece produced when drilling in rock. A water pressure of 100 lb. per sq. in. is maintained at the machine and an ample flow of water is required. The bit does not lose gauge during its entire life and there is no apparent limit to the depth of hole which can be drilled, since a new bit can be put in to follow an old bit. The maximum depth of hole drilled for this blast hole work has been 65 ft. in the horizontal rings.

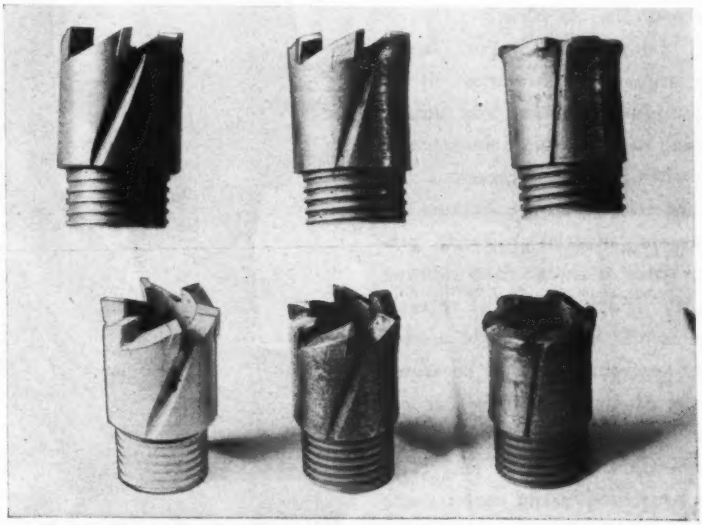
Loading the Holes

All of the earlier drilling was done in the EX size. It was found that the loading of individual sticks of powder into the holes, forcing them forward with jointed tamping sticks, was very slow. The process now in use employs spirally wound cardboard tubes 5 ft. in length and 1 3/16 in. inside diameter. A 1⅛-in. stick of powder fits smoothly into this tube and each tube is filled with powder allowing the last stick to project about 4 in., over which projection the end of the following tube is slipped. Primacord is passed through the first tube into the powder and this line of Primacord lies outside all the following tubes. Using this method, a 65-ft. hole can be loaded in about five minutes. If the ground drilled contains vugs or cracks these tubes pass through the openings and into the drill hole beyond, whereas individual sticks tend to fall into the openings so that it is frequently impossible to load to the end of the hole.

Holes have been drilled recently with an AX bit. It has been found that the rate of advance is almost as fast with this bit as with the EX size and the larger diameter makes it possible to place almost double the burden on the hole. The bit cost and the drilling labor cost are slightly higher with the larger AX hole but the total cost per ton of ore broken is very much less.

Use of the Bit for Exploration

Another field for the use of these bits which seems attractive is in drilling exploratory holes through soft rocks. Our experience indicates it would be difficult to obtain a high percentage of core recovery with this bit but sufficient core should be obtained to indicate the nature of the rock being drilled. If it were necessary to drill through such soft rocks in order to explore for ore beyond, it would seem that such bits might economically be used and then followed by bort bits when the depth had been reached at which it was desired to obtain a high core recovery.



The new bit at left, a bit after grinding in center, and a bit ready for discard after six grindings

Such bits seem to be applicable to certain soft ores but not to all ores. The same bits were tried at the Blueberry Mine of the North Range Mining Company, located near Ishpeming, Mich. This ore is so hard that in driving main level drifts in ore it is necessary to use 3½-in. drifters and detachable bits. Here, after drilling 40 ft., the edges of the tungsten carbide inserts were rounded off and one or more of the inserts had broken.

In the type of ore in which we have used it, the only other drilling method which can be used for cost comparison is that of jointed drill rods used

(*Continued on page* 61)

QUALITY engineering shows up in

1. Better weight distribution

2. Complete protection from sludge and water

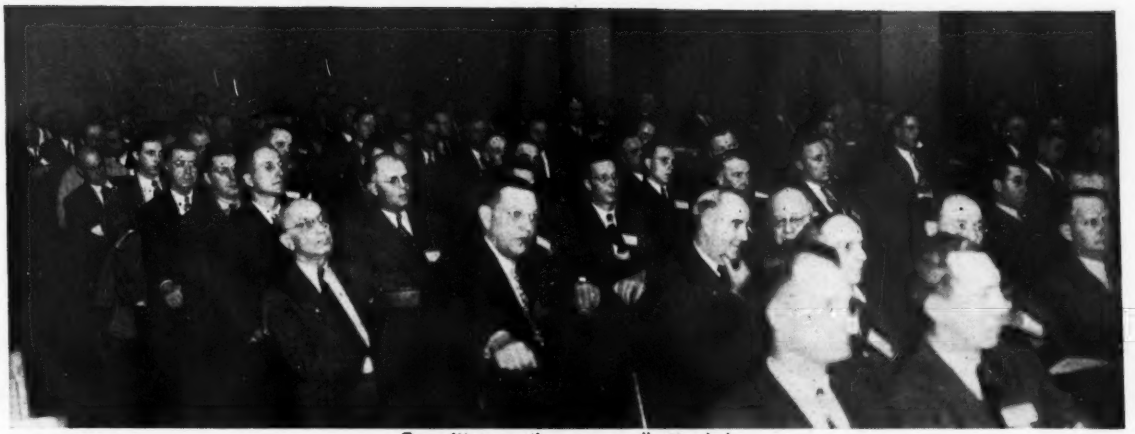
3. Better performance at all pressures

42 years of experience in designing stoping drills find their expression in the Gardner-Denver R104 Self-rotating Stoper. It's a safer stoper—because most of its weight is placed below the handle, assuring easy control of the machine even when footing is precarious. It's a more reliable stoper because its air-cleaning system positively prevents water or sludge from running into the drill, whether the throttle is on or off. And the R104 assures better performance at all pressures because of its perfect balance between hammer action and feed pressure. Write for bulletin and complete construction and performance details of the R104 Stoper. Gardner-Denver Company, Quincy, Illinois.

Gardner-Denver R104 Stoper

GARDNER-DENVER

SINCE 1859



Committee meetings were well attended

Activities of the Coal Division

Committees Hold Open Meetings at the Coal Convention in Cleveland, May 13, 14 and 15

IN a series of open meetings, the Coal Division Committees presented to the convention a number of accounts of their studies on improved methods of coal mine operation. Although a new feature, these meetings proved very successful in bringing the work of the committees to the closer attention of the coal industry. Finished reports, preliminary reports and outlines of studies to be made, were presented for a full discussion by committee members and non-members alike. As completed, the reports will be published by MINING CONGRESS JOURNAL and the account given here outlines the scope of the projects now underway and, in general, the progress being made.

* * *

UNDERGROUND MAIN LINE HAULAGE

THIS study was inaugurated two years ago by the Conveyor and Haulageroad Committees and while it was carried on jointly and concurrently, each committee prepared a separate report—one on track haulage and one on belt haulage, giving cost estimates for installing and operating each method of transportation. However, the first publications were considered as being more or less preliminary and at a joint meeting of the two committees in November, 1947, it was decided to prepare sequels to the preliminary studies and cover the costs of installing, maintaining and operating main line haulage, using belt conveyors and track for the following nine sets of conditions and under specifications as given below:

Conditions:

No. 1—1 mile —Level grade.
No. 2—1 mile —Up 2% grade.
No. 3—1 mile —Up 4% grade.
No. 4—2 miles—Level grade.
No. 5—2 miles—Up 2% grade.
No. 6—2 miles—Up 4% grade.
No. 7—3 miles—Level grade.
No. 8—3 miles—Up 2% grade.
No. 9—3 miles—Up 4% grade.

Specifications:

Main line only to be considered.
Haulage system to operate two eight-hour shifts.
Tonnage hauled to be 1,200 tons per shift, or 150 T. P. M.
Haulage system to be capable of handling peak loads of 150% of rated capacity, or 225 T. P. M.
Coal only to be hauled on two shifts.
Entries to be of sufficient height and width to permit installation of either belt, track, or both.
Power—250 volts D.C.
250 working days per year—double shift.
Production 2,400 tons per day—600,000 tons per year.
All equipment depreciated on a 10% basis.
Interest charges @ 3%.
Labor cost @ $1.00 per hour.

Several items in the specifications should have some explanation; among these are power, depreciation and labor as applied both to belt and track.

In estimating power requirements, no consideration was given to the cost of installation of conversion units as both committees came to the conclusion that either type of haulage would require the same substation capacity. However, trolley wire, feeders and bonds are included.

All members of the joint committee were satisfied to depreciate mechanical and electrical parts on a 10-year basis, but some members felt that belting would not last that long in underground service. Since discussing this with several operators and manufacturers who have had considerable experience with mine belts, it is believed that with proper installation, the belting will last 10 years. By "proper installation" is meant that the splices would be vulcanized; that the equipment would include automatic switches to stop the drives automatically if the belt should stop moving; that the main line belt is not to be operated in reverse but is to be paralleled by a 40-lb. track for handling men and supplies.

Labor charges vary in different mines because of customs, overtime, etc., so the committee thought that by assuming the labor at $1 per hour, any operator can apply his own wage rates to adjust the labor charge given in the reports, to his conditions.

Both committees have prepared rather elaborate cost statements, going into meticulous detail and explaining how the estimates were made. These will be published in full in sub-

UNDERGROUND TRACK AND MINE CAR MAIN LINE HAULAGE

ESTIMATED COST FOR INSTALLATION, MAINTENANCE AND OPERATION

	One Mile			Two Miles			Four Miles		
	Level	2%	4%	Level	2%	4%	Level	2%	4%
Equipment cost per ton—									
Track, trolley and feeders.	.0067	.0067	.0067	.0120	.0120	.0120	.0217	.0217	.0217
Rolling stock	.0260	.0260	.0260	.0283	.0283	.0283	.0295	.0295	.0295
Labor costs per ton—									
Installation	.0046	.0046	.0046	.0089	.0089	.0089	.0173	.0173	.0173
Maintenance and operation	.0133	.0133	.0133	.0433	.0433	.0433	.0433	.0433	.0433
Power cost per ton.....	.0025	.0068	.0116	.0050	.0136	.0232	.0099	.0272	.0463
Total cost per ton.....	.0531	.0574	.0622	.0975	.1061	.1157	.1217	.1390	.1581
Total cost per ton-mile..	.0531	.0574	.0622	.0487	.0530	.0578	.0304	.0347	.0395

Submitted April 28, 1947, by Sub-Committee on Track Haulage, E. H. JENKS, Chairman.

UNDERGROUND BELT CONVEYOR MAIN LINE HAULAGE

ESTIMATED COST FOR INSTALLATION, MAINTENANCE AND OPERATION

	One Mile			Two Miles			Four Miles		
	Level	2%	4%	Level	2%	4%	Level	2%	4%
Cost per ton—									
Depreciation at 10%.....	.0208	.0216	.0235	.0386	.0413	.0425	.0802	.0822	.0917
Interest at 3%.....	.0063	.0065	.0070	.0116	.0124	.0128	.0241	.0247	.0275
Supplies (10%)	.0021	.0022	.0024	.0039	.0041	.0042	.0080	.0082	.0092
Power	.0106	.0133	.0160	.0213	.0320	.0400	.0415	.0480	.0640
Installation—labor	.0004	.0004	.0004	.0009	.0009	.0009	.0016	.0016	.0017
Daily labor cost.....	.0133	.0133	.0133	.0167	.0167	.0167	.0267	.0267	.0267
Cost per ton.....	.0535	.0573	.0626	.0930	.1074	.1171	.1821	.1914	.2208
Cost per ton-mile.....	.0535	.0573	.0626	.0465	.0537	.0586	.0455	.0479	.0552

Submitted May, 1947, by Sub-Committee on Belt Haulage, A. E. LONG, Chairman.

sequent issues of THE MINING CONGRESS JOURNAL. The present issue can present only the summaries of the reports, showing estimated costs per ton of coal mined and cost per ton-mile hauled. These are submitted above and are preliminary in that a further review of the figures is to be made by each committee before publication of the approved reports and estimates.

* * *

UNDERGROUND POWER

SEVERAL phases of mine power use and distribution are under study by the committee and progress was reported on all of these. G. W. Acock gave a brief discussion on jackets for mine trailing cables, explaining a project now under consideration by the U. S. Bureau of Mines and the IPECA to change present thicknesses of cable jackets. This was discussed in the meeting, but no recommendation made.

The study on safety grounds for mining equipment is continuing, but D. E. Renshaw, Sub-Committee Chairman, said that although progress had been made, the subject was so complex that additional time would be needed before the report was finished. T. R. Weickel made some recommendations which the meeting discussed at considerable length and these recommendations will be given serious study by the committee and by others—manufacturers and operators—whom the committee will consult.

The Sub-Committee on A. C. Wiring Devices submitted the following report, which was approved and accepted by the meeting.

A.C. Wiring Devices

By E. P. Smith

The use of alternating current underground has been hindered by the lack of suitable wiring devices designed for mining service. The purpose of the Sub-Committee on A. C. Wiring Devices is to study this problem and make general recommendations describing the function and requirements of the equipment needed. The committee is not to make detailed designs. This phase of the problem must be left to the various manufacturers.

General Requirements

The essential difference between industrial and mining equipment is that the latter must be designed for portability. Frequent moving under adverse working conditions gives rise to the secondary requirements of ruggedness, small size, and light weight. Low height is especially important.

An AC distribution system usually requires the use of four wires, three hot wires, and one for frame grounds. The ground line carries no power current. Its purpose is to safeguard the men by keeping machine frames at ground potential under all conditions. Three-pole interrupting devices must be used and over current protection must be provided on all three hot or phase wires. American Mining Congress recommendations on color coding and polarization should be followed.

Face Distribution Box

A distribution box has three functions:

1. It provides a safe and convenient place to disconnect the trailing cables.
2. It provides over current protection for the trailing cables. It may also provide overload protection for the face equipment where such protection is not otherwise provided.
3. It provides an emergency means to cut off power under full load.

These functions are accomplished by use of the following elements:

1. Plugs and receptacles, bolted lugs, etc.
2. Over current devices such as fuses or circuit breakers. Additional protection may be obtained by use of a ground current tripping device.
3. Switches or circuit breakers.

The committee believes there is need of a face distribution box having

branch circuits for the face equipment such as a mining machine, a face conveyor, loader, a drill, and/or other equipment. Either fuses or circuit breakers may be used to protect the cables. Fuses have the disadvantage of permitting a motor to continue running on single-phase after one fuse has blown. The branch circuit plugs and fittings should normally be designed for four-conductor cable and the branch circuits should usually have the following one-hour ratings:

	220 volts	*440 volts*
Mining machine	150 amp.	100 amp.
Face conveyor ..	50 amp.	50 amp.
Drill	25 amp.	25 amp.

A large loading machine will require a circuit of the same capacity as a mining machine. A small conveyor loader may be operated from the 50-ampere outlet.

Room Neck Distribution Box—Conveyor Service

The room conveyor and the line to the face distribution box are connected to the feeders at the room neck. The committee recommends that a distribution box be designed for this purpose. It should have one 50-ampere circuit for the room conveyor and another circuit heavy enough to supply the face distribution box. To facilitate maintenance, parts should be interchangeable between the face box and the room neck box wherever possible.

* * *

PILLAR RECOVERY

ABOUT a year ago, a joint study on pillar recovery was undertaken by the Roof and the Mechanical Loading Committee. Several reports have been published, but the future work is to deal with specific methods of pillar extraction under various types of roof. Several of these reports are now in progress and E. H. Johnson, Committee Chairman, in introducing the discussion at the Cleveland meeting said:

"Conservation of coal resources is becoming a primary issue. This overshadows the effect of surface damage by pillar extraction and may lead to a re-appraisal of coal and surface values. However, a percentage figure on coal recovery is apt to be misleading as a measure for efficiency of hand or machine methods because of the difficulty of its proper determination and definition. This question of percentage recovery involves consideration of seam impurities; line and haulage barrier pillars; stumping areas for highway, railroad, cemeteries and other surface support; reservations for oil and gas wells and all the variations in accuracy of original estimates and surveys.

"For the purpose of our study, we are defining pillar recovery to include those methods of mining where caving of roof accompanies the extraction of the coal along a more or less uniform room fracture line. The committees are agreed that the highest percentage of final recovery is obtainable by removal of a small percentage of coal in *first mining;* and that the block system of mining is best adapted to high recovery by caving methods, whether done by hand or machine operation. Our findings show that this philosophy is not limited to the Pittsburgh District but also extends to most of the areas using machine loading where pillars were formerly drawn by hand mining."

Studies on recovery methods in various conditions are now under way and two preliminary reports were presented. These are extracted below and their full content will soon be published.

Recovery Under Strong Top

By J. F. Mazza

An operation in pillar mining which has been successful in our field is in the Lower Freeport measures. The seam is 72 in. high, including 6 in. of middle binder, and has an average cover of about 400 ft. Roof conditions immediately over the coal are of a tender nature, but from about 5 ft. above the vein, the roof consists of strong, tough slate and shale with practically no sandstone, unless near a faulted area. The vein is underlaid with a hard fire clay bottom that makes an excellent floor for the haulage system.

All work in this mine is done on what we call "single entry full retreat." Butts are turned as a two-entry system on 350-ft. centers off the flat and are driven up their entire distance before any rooms are turned. Pillar lines across butts are maintained on a 45-degree angle. All coal is taken out of the entry down to and including everything but the chain pillar, which is left in temporarily and is mined out by the rooms off the next succeeding butt.

In a strong, tough roof, it appears evident that long pillar lines provide better mining than short ones. Short pillar lines have a tendency to allow a strong roof to sag rather than break, and is very liable to cause a squeeze on the pillar ribs while the long lines have an advantage, close supervision must be applied to keep them effective.

Recovery for the mine is very good. Tonnage figures have been kept very carefully, and the mined-out areas checked as closely as possible, and the percentage of recovery has been as high as 94 per cent, although the average has been near 90 per cent over the entire pillar area.

Recovery Under Medium Top

By J. A. Younkins

Roof conditions in our mine are somewhat variable but are generally good for the purpose of controlling falls. The coal bed lies immediately beneath the Mahoning sandstone which averages about 50 ft. in thickness; generally, between the sandstone and the coal there is a layer of hard vitreous black shale sometimes called "cannel coal" ranging from a few inches to 2 ft. thick, above which is a bed of sandy shale from 2 to 3 ft. thick.

Following the installation of mechanical loading, the mining system was changed to a modified block system to improve operating performance. Generally, four butt entries 12 ft. wide are driven on 100-ft. centers from the panel faces to the adjoining faces, leaving 100 ft. between the inby entry and the gob. Breakthroughs are driven on 100-ft. centers at 90 degrees; the 88-ft. by 88-ft. blocks are split parallel to the rooms, leaving 38-ft. by 88-ft. pillars which are extracted by driving open-end "lifts" or cut-overs, 15 ft. to 18 ft. wide across the 38-ft. side. When the entries are driven up, pillar extraction is started by driving 100-ft. break-throughs from the inby entry across to the gob, splitting the blocks and mining the pillars as described above.

Experience with this system has proven that short rib lines are practical at the mine and result in better recovery. In general, each butt is driven up and retreated independently and the rib line across the panel is not kept in step as was the former practice. The average recoveries for hand loading from 1931 to 1940 inclusive and for mechanical loading from 1941 to 1945 inclusive indicates a definite improvement in recovery with mechanical mining.

* * *

ROOF ROCK CHARACTERISTICS

F. G. SMITH, chairman, introduced the studies on roof rock classifications, which are supplementing the study on pillar recovery by stating that:

"The work of the Roof Action Committee prior to its entrance into this particular project has been concerned with the very simple question which is so very hard to answer: Why does roof fall? You can usually get a variety of answers to that.

"We know that there are a few general causes, but the difficulty of predicting how roof is going to act is very great and, as an approach to

this problem, we have been carrying on for some time a study which attempts to determine what the characteristics of roof rocks are.

"As you all know, each field has its own local terminology which is, at least, not too descriptive, and our committee has been attempting to gather data which would enable us to classify roof rocks as to their reaction to exposure by mining and to develop definite material on their characteristics. This work has gone on under the direction of Dr. Paul Price, State Geologist of West Virginia, who will discuss this matter of roof rock characteristics and some of the very interesting formation that is being turned up at the present time."

Mine Roof Studies

By Paul H. Price

OUR knowledge of roof rocks over coal and their behavior under varying conditions is surprisingly meager, and indefinite, especially so considering the age of the mining industry and the importance of roof behavior to successful operation. This is not entirely due to a lack of consideration, because a great deal of work has been done—but more work remains to be done as roof falls continue to be the major cause of mine fatalities.

The cause of roof failure can be grouped roughly into two main classes:

1. Structural.
2. Weathering.

Perhaps a third should be added, i.e., a combination of the two.

1. Structural falls may be due to active geologic stresses, or to weaknesses from fractures as joints or cleat, faults, clay veins or dikes, stratifications, stumps or kettle bottoms, erratic boulders, or plant fossils.

2. Weathering—Falls due to weathering result primarily from oxidation and/or hydration of the rock minerals. This type of failure produces primarily a slaking of the roof but when penetrating fractures some distance above the coal, it can account for sizable falls.

A phase of the roof problem which is one of the most important, if not the most important, and which has received perhaps the least consideration, is the structural and especially the regional fracture system or pattern. Our committee has already done some work along this line, and we now propose to make further investigation of this phase. Fortunately for us in this study are the many stripping operations. Over 1,400 permits for strip operations have been issued in West Virginia. There are at present some 200 active projects operating in 21 different seams. These have "opened the boom," so to speak, and the data are all there awaiting interpretations. Never before was it possible to see and study roof rock and associated strata as it is now. Only recently a veteran mine inspector said to me that he had learned more about roof conditions in his one year with strip mining than he had in 35 years underground.

Summarizing, we believe that the information that can be gotten from a study of roof rocks in "highwalls" when properly evaluated and interpreted, will be of value in underground mining. If so, perhaps the number of roof fall accidents can be lessened with an attendant decrease in mine maintenance costs. It is further expected that this information will be of value in the study of pillar recovery.

* * *

FULL SEAM MINING

THIS study has been under way by the Surface Preparation Committee for the past year and, as explained by T. W. Guy, chairman, several reports on individual operations have been compiled and published. In addition, subcommittees have been appointed to report on several phases such as cost of preparation and quality of products, method and cost of refuse disposal and coordination of production and preparation planning. A general over-all picture of the progress in full-seam mining was contained in a very comprehensive report by R. L. Anderson, which was published in the May MINING CONGRESS JOURNAL. This report was presented by Mr. Anderson at the meeting, illustrating his talk with lantern slides of the charts he had prepared. Absence of the other subcommittee chairmen prevented presentation of additional studies being made, but these will be published in later issues of MINING CONGRESS JOURNAL.

* * *

SAFETY COMMITTEE

THE safety studies on fire protection, cable failures and rock dusting have made progress, but through the unavoidable absence of these three sub-commitee chairmen, there were no reports submitted. However, all of the subjects were discussed informally in open meeting and a number of points brought out which will be referred to the various sub-committees.

The study on haulage accidents has made excellent progress and a preliminary report was submitted as extracted below.

Mine Haulage Accidents

By A. J. Bartlett

At the October, 1945, meeting of the Safety Committee, a discussion arose as to whether or not the frequency rate of haulage accidents is higher than the frequency rate of roof fall accidents, when taking into consideration that fewer number of men are employed in haulage as compared to those exposed to roof fall accidents. A Sub-Committee on Haulage was appointed to make a study of this subject covering Company, State and Federal records, and this committee decided to compile statistics from five major coal-producing states over a five-year period. To date, two of these studies have been completed from state records.

A study of the accident records contained in the Annual Report of the Department of Mines of the State of West Virginia, covering fatal and non-fatal accidents for the five-year period, 1940 to 1944, inclusive, brought out the following: Of the 384 men killed, 48 were killed in derailments, 15 while coupling and 321 from other causes as follows:

Insufficient clearance.
Collisions.
Trips breaking loose on grades.
Runaways from improper scotching and blocking.
Caught between the car and face or rib.
Caught on low top.
Dragged out of deck by cable.
Caught in track while handling switches without throws.
Losing balance and falling out of motor.
Getting off in front of moving trip to throw switches and open doors.
Attempting to escape from electric arc and fell or jumped out of motor.
Caught by loose clothing and dragged into close clearance.
Excessive speed.
Backing up trips without signal from brakeman.
Starting or running trips without orders or signals.
Disregard of instructions from dispatcher.
Standing up in deck nipping and fell out and run over.
Riding in trip and raised up and struck roof or header.
Jumping from motor of runaway trips.
Thrown out of car by sudden stop or jerk.
Crossing track in front of oncoming trip.
Jumping on front bumper of moving cars and motors.
Riding front bumper of trips being pushed.
Failure to properly align switches.
Defective track and switches without throws.
Riding between cars,

(NOTE: Mr. Bartlett presented a detailed analysis of the haulage accidents in West Virginia and Illinois, which will be contained in the complete report that will be published in MINING CONGRESS JOURNAL. His report concluded with the recommendation that the compilation of the statistics be continued to cover the five major coal producing states.

WHEELS OF GOVERNMENT

As Viewed by A. W. DICKINSON of the American Mining Congress

SENATE and House leaders are mapping the legislative program for the homestretch drive to adjournment July 26. In addition to 11 of the 12 departmental supply bills still to be sent to the White House, there is evident determination to enact legislation to cash GI terminal pay bonds, increase the minimum wage under the Fair Labor Standards Act, establish the line of succession to the Presidency and to unify the armed services.

Open question remains as to whether the vetoed individual income tax reduction bill will be reenacted effective January 1, 1948, instead of July 1, 1947, and whether the Taft-Hartley labor bill will be amended to give the Government greater power to control strikes in pivotal industries.

Federal Labor Relations Act

The Taft-Hartley Labor Management Relations Act, 1947, became Public Law 101 on June 23, when the Senate overrode the White House veto of June 20 by a vote of 68 to 25. The House had immediately overridden the veto 331 to 83 but a 30-hour filibuster in the Senate delayed the final overriding vote until 3 P. M., June 23.

The President's veto message condemning the Act was termed by the bill's chief sponsor Senator Ball (Rep., Minn.) as "the worst issue of distortion that I have ever seen come out of the White House," to which Senator Taft added the comment that, "there is hardly a sentence in the President's message which is not subject to direct challenge." Senator Ives (Rep., N. Y.) characterized the message as "utterly extreme in an uncalled for manner."

After the smoke had cleared away the President issued a statement saying, "For my part, I want to make it unmistakably clear that, insofar as it lies within my power as President, I shall see that this law is well and faithfully administered . . . I call upon labor and management, therefore, to exercise patience and moderation in accommodating themselves to the changes made necessary by the Act." The President went on to say that while he had expressed his objection to the legislation, it is now the law of the land and became law in accordance with the constitutional processes of our Government, and that we must all respect its provisions.

Tax Bill Veto

A different fate befell the Knutson individual income tax reduction bill vetoed by the President June 16. A surprise result came out of what was intended to be a House vote to override the veto, when the tally showed two votes short of the two-thirds majority. Voting to override were 233 Republicans and 35 Democrats; to sustain, 2 Republicans, 134 Democrats and 1 American-Laborite.

On June 24, Ways and Means Committee Chairman Knutson reintroduced the vetoed bill with the effective date changed from July 1, 1947 to January 1, 1948. Congressional leaders are sounding out the possibility of passing the reintroduced measure, but there are threats of community-property and other amendments which make the result open to question.

Meanwhile the House has unanimously approved a bill to freeze the social security payroll tax at the present rate of 1 per cent until December 31, 1949, increasing to 1.5 per cent at that time and to 2 per cent at January 1, 1957.

The House Committee on Ways and Means is speeding up on its hearings in preparation for a general revenue revision next year. Subjects included are excise taxes, community property, corporation taxes, pension trusts, foreign personal holding companies, dividends, alien residents, U. S. citizens abroad, depreciation, obsolescence, amortization of emergency facilities, exemptions and deductions, capital gains, general revisions, and individual income tax.

Chairman Knutson has appointed a special advisory tax study committee to work on the revision of the tax structure. Personnel: Former Treasury Undersecretary Roswell Magill, chairman; Governor Frank Carlson of Kansas; former Treasury Undersecretary John W. Hanes; Mathew Woll, AFL; Clarence Poe of the *Progressive Farmer;* N. K. Carnes of the Central Cooperative Livestock Association; John L. Connolly, Minnesota Mining and Manufacturing Co.; J. Cheever Cowdin, Universal Pictures; E. H. Lane of the Lane Co.; Tax Counsel Wright Matthews; and Dr. C. S. Duncan, a Washington economist.

Coal Negotiations

Government control of bituminous coal mines terminated at midnight June 30, but beginning June 24, following the Senate override of the veto on the Taft-Hartley labor bill, thousands of miners stayed home, although their legal vacation did not begin until June 28. Representatives of operators and miners are now conferring in Washington, following

Washington Highlights

CONGRESS: Driving for adjournment.

LABOR ACT: Taft-Hartley bill now law.

TAX: Vetoed Knutson bill revived.

COAL: Northern producers spearhead wage agreement.

MINE INSPECTION: Coal industry resists Federal police powers.

STREAM POLLUTION: Legislation unlikely this session.

FERTILIZER PROGRAM: Socialistic bill denounced.

MINIMUM WAGE: Increase to 60 cents forecast.

PREMIUM PRICES: 2-year extension pushed.

press statements on June 27 that Benjamin Fairless, president of the U. S. Steel Corporation, and George M. Humphrey, chairman of the board of Pittsburgh Consolidation Coal Company had indicated that they would go along on the miners' demand for a basic wage of $13.05 for an 8-hour portal-to-portal day in place of the present $11.85 for 9 hours. John Lewis is reported to be demanding a contract expiring April 1, 1948 on 30-day advance notice; inclusion of a clause in the contract to the effect that the miner will work "when willing and able" (now in the anthracite agreement) as a protection against suit or other penalty which may result from unauthorized strikes; increase from 5 cents to 10 cents per ton in the welfare fund payment; six paid holidays; time and one-half for Saturdays and double time for Sundays as such, regardless whether they are the sixth and seventh consecutive working days; and collective bargaining for supervisory employees.

Demands of the miners and the offer of the Northern and Mid-Western operators at the time negotiations ceased on May 31 are discussed in the June issue of the JOURNAL.

Police Power to U.S.B.M.

The Senate Public Lands Committee has considered a resolution introduced at the request of Interior Secretary Krug, which would have incorporated into law for one year the Federal Mine Safety Code for bituminous coal and lignite mines. Under the resolution (S. J. Res. 130) Bureau of Mines inspectors were authorized to serve compliance orders upon violators of the Code and violations were made punishable by fines. Because of vigorous opposition registered at hearings on June 23 by State Mine Inspectors and representatives of operating companies, it was thought unlikely that there would be further action on the resolution, as it appeared that the Code would be included in the anticipated contract between the bituminous coal operators and the miners.

At the committee hearing, Interior Secretary Krug and Director Sayers of the Bureau of Mines urged enactment of the resolution. Opposing the resolution were James W. Haley, attorney, NCA; J. A. Bartlett, director of safety, Island Creek Coal Co.; R. L. Ireland, Jr., Ohio Coal Assn.; B. H. Manley, Utah Coal Operators Assn.; Richard Maize, director, Pennsylvania Department of Mines; Arch Alexander, chief, Department of Mines, W. Va.; Hugh McLeod, state mine inspector, Wyoming; Harry Thomas, chief, Department of Mines, State of Kentucky; John McNeil, Northern Colorado Coal Producers Assn.; Walter R. Thurmond, Sr.; Southern Coal Producers Assn.; W. P. Tams, president, Gulf Smokeless Coal Co.; Harry Kennedy, Kanawha Coal Assn.; John Lucas, Southwestern Wyoming Coal Operators Assn.; and M. L. Garvey, Pocahontas Fuel Co.

R. L. Ireland, Jr., appearing through arrangement by the American Mining Congress, stressed that the U. S. Bureau of Mines was organized as a research bureau, not a police force, and that the resolution, if enacted, will destroy its real value to the cause of safety in coal mines. He explained to the Committee the differences existing between the Krug-Lewis Federal Safety Code and the State mining laws in many instances, and the wide variations in mining conditions throughout the country which make a rigid Federal Code impracticable. He stressed the fundamentals of safety practice as (1) rock dusting; (2) adequate ventilation; (3) good housekeeping to prevent fires; (4) a second way out of the mine—clear up obstructions.

The four State coal mine inspectors vigorously insisted that their inspectors and their mining laws are far better fitted to safeguard workmen than the Federal inspectors and the Federal Code.

On July 3 the Public Lands Committee, acting on current information that the Code would be included in the coal operator-miner contract, reported S. J. Res. 130. The resolution was rewritten to direct U. S. Bureau of Mines inspectors to notify owners, operators and State agencies in cases where Code standards are not being observed with respect to ventilation, rock dusting, storage and use of explosives, roof and rib support, use of water or water with a wetting agent or other means of dust control where mining operations raise an excessive amount of dust, and prevention of fires in the underground workings of the mines. Owners, operators and State agencies are required to report to the Director of the Bureau of Mines the action taken with respect to the inspectors' recommendations. All records in connection therewith are to be made public and the Secretary of the Interior is required to report each three months to the Congress all inspections, recommendations and action taken by owners, operators and State agencies.

Stream Pollution

Senator Malone's (Rep., Nev.) Public Works subcommittee still has under consideration the Barkley-Taft Water Pollution bill, S. 418, following the hearings which were discussed in previous issues.

The House Committee on Public Works concluded four days of hearings on the companion Spence (Dem., Ky.) bill and the Mundt (Rep., S. D.) measure, which would prohibit discharge from new sources of pollution, except by approval of the State Health Authority made in compliance with regulations approved by the Surgeon General.

Representatives of the mining industry appeared in opposition to these bills and counsel for the Governor of New Jersey vigorously opposed Federal intervention, declaring "we are doing better than the Federal Government could . . . . . it can't be done from Washington half so well!" A representative of the Potomac River Commission, which is functioning under an interstate compact, opposed the enforcement features of the bill stating that the force of public opinion brings cooperation by the States and that "we have never made a recommendation that the States refused to act upon."

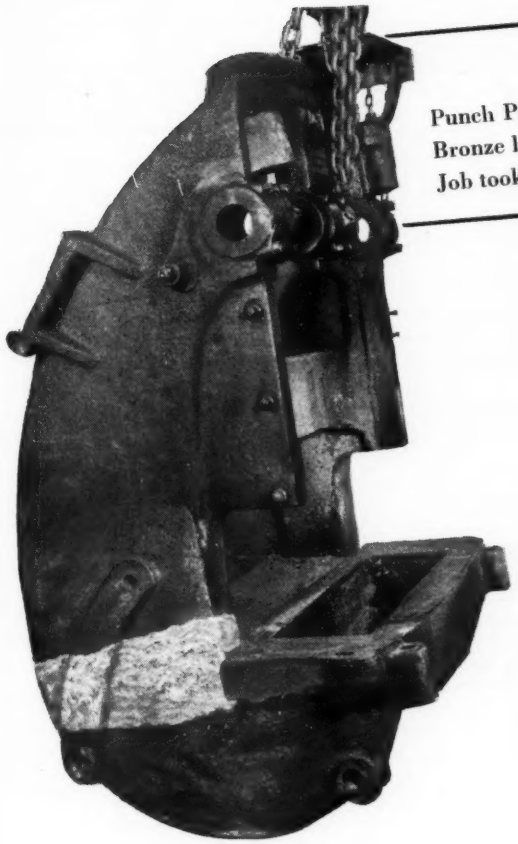
The American Mining Congress again emphasized that the problems of water pollution are essentially of a local character and require local treatment. Strong opposition was made to the granting of injunctive power to the Surgeon General and to the prohibition against new sources of pollution contained in the Mundt bill. The Committee was told that the individual States are dealing with their own water pollution problems, and that many States have joined in compacts for the abatement of water pollution extending over large watersheds. Emphasis was placed upon the need for sound and sincere cooperation between the States, municipalities and industries affected and the U. S. Public Health Service, the Geological Survey, the Bureau of Mines and the Corps of Engineers of the U. S. Army. It was urged that care be exercised to safeguard the Federal Treasury against undue or excessive expenditures of public funds.

Government Fertilizer Program

The Senate Commitee on Agriculture concluded hearings June 27 on S. 1251, the "National Soil Fertility Act" discussed in previous issues. Senators Hatch of New Mexico and Holland of Florida, representing potash and phosphate producing States, respectively, appeared in opposition to the measure and Senator Hatch particularly asked that the provisions of Title IV, barring renewal of leases to present lease holders, be stricken from the bill.

President Horace M. Albright of the U. S. Potash Company told the Committee that private industry has met the challenge of the fertilizer

(*Continued on page* 48)



REPAIRED

Punch Press frame repair-welded with 52 lb. of ⅜" Tobin Bronze by the Sutton-Garten Company, Indianapolis, Ind. Job took one day for preparation and one day for welding.

RECONDITIONED

This group of worn and broken gears from wire braiding machines was quickly and economically reconditioned with Tobin Bronze Welding Rod.

...by TOBIN BRONZE WELDING

Almost any piece of equipment made of cast iron, malleable iron, steel or copper alloys can be quickly and economically repaired by oxy-acetylene welding with Tobin* Bronze.

Because of the low temperature used when welding with bronze, no serious stresses are set up, there is less chance of warping or cracking and parts can often be welded without dismantling equipment.

For years, this method of bronze welding has been used for reclaiming broken, fractured or worn equipment, or for building up bearing surfaces—at a fraction of the cost of replacement parts.

Write for Publication B-13, containing detailed information on Anaconda Welding Rods, including Tobin Bronze and "997" (Low Fuming). 47171A-Rev.

*Reg. U. S. Pat. Off.

ANACONDA
from mine to consumer

Anaconda

WELDING RODS

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

Subsidiary of Anaconda Copper Mining Company

In Canada: ANACONDA AMERICAN BRASS LTD.
New Toronto, Ont.

Personals

E. V. Daveler, vice president and director of the American Zinc, Lead and Smelting Co., was awarded the honorary degree of Doctor of Laws by the University of California on June 21.

The following is the citation delivered by President Sproul of the University in conferring the honorary degree. "Erle Victor Daveler, distinguished mining engineer, skilled in the efficient and economic use of the metal resources of the nation and able administrator of large mining enterprises, expert in the industrial application of metallurgical science, friend and trustee of various educational institutions and alumnus who has graduated 40 years ago and today receives his third degree from the University."

Mr. Daveler has been active in the affairs of the American Mining Congress and held the position of chairman of the Finance and Budget Committee for 10 years.

Henry T. DeBardeleben, former president of the DeBardeleben Coal Corp., of Birmingham, Ala., was recently elected chairman of the board. **Henry F. DeBardeleben,** formerly executive vice president and general manager, was elected president in his place.

Dr. R. R. Sayers, director of the Bureau of Mines, has designated **Samuel A. Gustafson** as acting supervising engineer at Denver to replace George E. Woodward, who died April 28. With the Bureau since 1940, Mr. Gustafson also is a graduate of the Colorado School of Mines. He served as Captain of Engineers during World War II and, prior to entering Federal service, worked for several mining companies and the state of Colorado as engineer, surveyor, foreman and accountant.

L. F. Crouse was recently made consultant for the Coal Mines Administration of the U. S. Department of the Interior, Washington, D. C. He was formerly general superintendent of Monroe Coal Mining Co. at Revloc, Pa.

Hugh J. Fraser, vice president of the International Nickel Company, Inc., has been placed in general charge of all plant operations of the company in the United States, according to an announcement by Dr. John F. Thompson, executive vice president. **John A. Marsh,** assistant general manager of the Huntington, W. Va., works, has been appointed Mr. Fraser's assistant, with the title of assistant to the vice president.

P. R. Paulick on June 1 terminated his connection with the Hellier Coal and Coke Co. as general manager to return to coal mine consulting practice at Library, Pa. During the month of July he expects to be in Nova Scotia working on coal mine examination.

Louis S. Cates, mining engineer and president of the Phelps Dodge Corp., received an honorary degree June 4 from Columbia University in New York at its 193rd Commencement exercises. Mr. Cates was given the degree of Doctor of Science from Dr. Frank D. Fackenthal, acting president of the University. **Harvey S. Mudd,** mining engineer of Beverly Hills, Calif., also received an honorary degree at the same ceremony.

Fred F. Netzeband, of Joplin, Mo., who resigned recently as secretary of the Tri-state Zinc & Lead Ore Producers Assn., has left for Keetley, Utah, where he has been retained in a consulting capacity to do industrial air hygiene work for three major metal mining companies in that district. The three companies are Park Utah Cons. Mines Co., New Park Mining Co., and Silver King Coalition Mining Co.

Two men prominent in the mineral industry were awarded the honorary degree of Doctor of Engineering at the commencement of the School of Mines and Metallurgy of the University of Missouri at Rolla, Mo., on June 3. These were Dr. L. E. Young, consulting engineer of Pittsburgh, Pa., and Dr. Russell B. Caples, manager of the Great Falls Reduction Department of the Anaconda Copper Mining Company, Great Falls, Mont. Dr. Young delivered the commencement address upon the subject: "The Engineer and American Free Enterprise." In the photograph, from left to right, are Dr. Frederich A. Middlebusch, president of the University of Missouri; Dr. L. E. Young; Dr. Russell B. Caples; and Dr. Curtis L. Wilson, dean of the School of Mines and Metallurgy of the University of Missouri

Effective June 1, 1947, **A. J. Breitenstein** was appointed assistant to president in charge of engineering for the H. C. Frick Coke Company, United States Coal and Coke Company, and associated companies, succeeding **K. L. Konnerth,** who has been appointed general manager of operations. **R. H. Knapp** was appointed chief engineer, succeeding A. J. Breitenstein.

Eugene A. White recently retired as manager of the Tacoma Smelter, an affiliate at Tacoma, Wash., of the American Smelting & Refining Co., after 37 years service. **Earl H. Marble** has been appointed as the new manager after being the smelter's superintendent for the past 11 years.

Harold L. Walker has been appointed as acting director of the Illinois Department of Mines and Minerals by Governor Green. Mr. Walker has been head of the Department of Mining and Metallurgical Engineering at the University of Illinois.

Edwin W. Mills, of Salome, Ariz., was appointed to the board of governors of the Arizona Department of Mineral Resources. He will fill the term of the late **J. E. Layton,** of Chloride, which expires January 31, 1948. For a number of years Mills has been engaged in the exploration of property in the Sheeptanks district and has taken a prominent part in the activities of the Arizona Small Mine Operators Association, being chairman of the association's Ellsworth Council and a member of its state board of directors.

James Prendergast, president, Susquehanna Collieries Co., and vice president of M. A. Hanna Co., has announced that **C. A. Gibbons** was recently appointed as vice president of Susquehanna Collieries and will also assume the duties of executive director of anthracite sales of the M. A. Hanna Co.

Lester Kitch, engineer with the Consolidated Copper, Inc., of Kimberly, Nev., for the past nine years, has resigned to join the staff of the American Smelting and Refining in Southern Peru. **Kenyon Richard,** former chief geologist for the company, will accompany him.

The election of Admiral **Ben Moreell,** U. S. N. (Ret.) to the board of trustees of Industrial Hygiene Foundation is announced by Andrew Fletcher, president of St. Joseph Lead Company, New York, and chairman of the Foundation's board. Admiral Moreell, who delivered the keynote address at the Foundation's last annual meeting on "Production Comes from People," was recently elected president and board chairman of Jones and Laughlin Steel Corporation.

Announcement has been made by George R. Higinbotham, vice president-operations of Consolidation Coal Company (West Virginia), of the appointment of **Harold B. Wickey** as superintendent of Mine No. 38, Fairmont, W. Va., succeeding J. C. Constable who resigned as of May 20, 1947.

Albert Hermon Case, vice president and consulting engineer of Tennessee Corporation, was awarded a Medal for Excellence by Columbia University on June 3. This medal is presented annually to an alumnus for public service. Mr. Case graduated from Columbia University as Engineer of Mines in 1905.

The Peter F. Loftus Corporation, consulting engineers of Pittsburgh, has announced the addition to its staff of **Edward T. Moore** and **Charles B. Cochran.** Mr. Moore has been a practicing consulting electrical and mechanical engineer for over 35 years. Prior to joining the Peter F. Loftus Corporation he was consulting engineer and director of research for the Electric Heating Equipment Company of Philadelphia. Mr. Cochran was assistant superintendent of the power division of the Westvaco Chlorine Products Corporation of Charleston, W. Va., with whom he was associated for 12 years.

— *Obituaries* —

W. Earl Greenough, 62, prominent mining engineer and manager of the Atlas Mining Company of Mullan, Idaho, died June 3 of a heart ailment after 10 days' illness.

During the war Mr. Greenough served on the metals production board in the lead, tin and zinc division and for a time was stationed at Salt Lake in charge of field work for the board. In Washington he served with the quota committee which set up the premium price plan for lead and zinc. Later, while in Salt Lake, he was instrumental in revising the block leasing system.

Recently Mr. Greenough published a short but comprehensive history of the evolution of the Coeur d'Alene mining district, which appeared serially in the *Wallace Miner.* There was such a large demand for the story he decided to print it in pamphlet form and it is now in process of publication.

Lucius W. Mayer, a partner in the firm of Rogers, Mayer & Ball, New York consulting mining engineers, died June 11 in his home in New York City after an illness of several months. His age was 65.

Mr. Mayer received his M.E. degree in 1904 from Columbia University. He began practicing his profession with the Stratton Independence Mining Company, Ltd., at Cripple Creek, Colo., in 1904, and later was associated with the Federal Lead Company at Flat River, Mo. From 1908 to 1916 he was associated with A. Chester Beatty in general consulting work. He was a consulting engineer for Eugene Meyer, Jr., Company in 1916. He had been a member of his present firm since 1917. He was the author of "Mining Methods in Europe," 1907, and "Financing of Mines," 1916.

Edward James Matthews, mining operator and Seattle business man, died late in May, aged 81 years. Although born in Dayton, Ohio, he had lived in Seattle and in Alaska since the turn of the century. At one time he was president of the Keewalik Mining Co. of Candle, Alaska, and president of the Fairhaven Gold Dredging Co., also in Alaska.

Russell E. Lord, Chloride, Ariz., died on May 14 as a result of burns received in an accident two days previously. Lord was vice president and general manager of Minnesota-Connor Mines, Inc., and general manager of the Summit mine. He was president of the Chloride Council, Arizona Small Mine Operators' Association.

James C. Hutchinson, retired mining man, died recently at Seattle at the age of 70 years. During the last 20 years he had been general manager of the magnesite mine of the Northwest Magnesite Company near Chewalah, Stevens County, Wash.

Samuel Pursglove, long a prominent figure in the bituminous coal industry, died on June 10 at Morgantown, W. Va., at the age of 72. Mr. Pursglove had retired but during his active business life he operated coal mines in Ohio, Pennsylvania and West Virginia, and was particularly identified with the coal industry of Northern West Virginia.

Dr. Thomas T. Read, internationally known mining and metallurgical expert and Vinton Professor Emeritus of mining engineering at the School of Mines, Columbia University, died May 29 of a heart ailment at the age of 67. A graduate of Columbia University, where he received a Ph.D. degree in 1906, Dr. Read was well known throughout the industry as former supervising mining engineer of the U. S. Bureau of Mines. He left the Bureau in 1929 to accept a professorship at Columbia University. In 1946, shortly before he retired, he defended the soft coal industry against charges made by John L. Lewis to the effect that safety measures and health facilities for miners were inadequate.

Wheels of Government

(*Continued from page* 44)

demand and will continue to do so better and faster and cheaper than the Government can do it. He explained the restrictions on prospecting permits issued by Secretary Ickes under which exploration for new potash reserves had practically ceased and condemned the leasing regulations under which the Secretary may commandeer a portion of a producer's output.

Albright vigorously opposed Title IV of S. 1251 which declares that remaining reserves of phosphate and potassic minerals in the public domain "shall be held as a public trust, to be released only in such amount as will effectively serve the public interest." He made particular reference to the provision that leases *must* include provision for the sale of a percentage of the production for use in the Government fertilizer program, pointing out that this clause would really authorize the Government to commandeer practically all of a lessee's production of potash. He made definite objection to a provision which would terminate any lease at its expiration, if its lines extend within any area set aside as a reserve. This, he said, would permit the Secretary of Interior to put any existing operator out of business. He castigated this feature as a violation by the United States of a contract obligation and as stark confiscation of property and legal rights.

Albright explained that there are ample deposits of phosphate and potash in this country and that the current situation calls for more production rather than more reserves. He charged that S. 1251 is socialistic in purpose and that it is only a step further to requisition enough material and to manufacture enough fertilizer at the taxpayers' expense to supply it free to all the farms in the country.

No further action is anticipated during the present session of Congress and the Committee is expected to devote careful study to a substitute bill by Department of Agriculture Secretary Anderson, which reduces the extent of Government interference in the fertilizer business, but still retains some of the objectionable features of Title IV.

Minimum Wage

On June 27 the House Labor subcommittee began hearings on a number of bills which would amend the Fair Labor Standards Act to increase the current 40-cent minimum wage to 65, 70 and 75 cents an hour. The Chairman of the subcommittee has stated that the final figure approved will probably be a 60-cent minimum.

Meanwhile, Congress has killed the President's Reorganization Plan No. 2 which would have given the Secretary of Labor direct supervision of the Wage-Hour Administration.

The Wage-Hour Administrator has set up a twelve-man Advisory Committee consisting of three men named by NAM, three by the U. S. Chamber of Commerce, three by AFL and three by CIO to make recommendations for revision of salary standards for executives and administrative exemptions under the Act. Under discussion is the possibility of advancing the salary tests from $30 to $45 per week for executive employees and from $200 to $300 per month for administrative and professional employees.

Premium Price Plan

Latest development in this legislation is the reporting by the House Public Lands Committee and the granting of a rule for floor consideration of Representative Allen's (Rep., Ill.) bill, H. R. 1602, which would extend the Premium Price Plan for copper, lead and zinc for two years with expenditures not to exceed $35,000,000 in each year. Administration would be under the Department of Commerce. The Russell (Rep., Nev.) bill, H. R. 2455, discussed in previous issues appears to be stymied.

On June 24 Representative Ploeser (Rep., Mo.) introduced H. R. 3947, amending the Stockpiling Act of 1946 so as to provide for the purchase of strategic and critical minerals from marginal mines on fixed-price contracts, in excess of the going market price, in order to assure continued operation of such mines and the exploration and development of ore bodies. Ploeser's measure would establish a national policy of encouraging private enterprise to aggressively explore for, develop and mine strategic and critical minerals in order to expand known mineral reserves and assure an adequate supply for defense requirements. It includes the observation that the operation of such mines is itself a means of developing unknown reserves, that it is difficult and sometimes impossible to reopen abandoned mines and that the cost of resuming operation of abandoned mines is often prohibitive.

Contains a wealth of Valuable Data on PREVENTIVE MAINTENANCE of Commutators and Slip Rings

Make sure your files contain a copy of this handy reference guide—for all sizes of motors and generators. It illustrates and describes the latest methods and equipment for commutator and slip ring maintenance, including Ideal Resurfacers, Cleaning Stones, Brush Seaters, Undercutters, etc. Write now for your copy of this Free Book!

IDEAL

IDEAL INDUSTRIES, Inc.
Successor to Ideal Commutator Dresser Co.
1963 Park Avenue Sycamore, Illinois

NEWS and VIEWS

Tennessee mine of Tennessee Schuylkill Corp., at Chloride, Ariz. This mine has been a lead-zinc producer for many years and is said to have more developed ore reserves today than at any time in its history

Eastern States

Coal Meeting Well Attended

One hundred twenty-five visitors and members of Central West Virginia Coal Mining Institute heard an explanation of war-developed mine rescue equipment and saw two color films at Fairmont, W. Va., on Thursday evening, June 19, 1947. G. R. Higinbotham, vice president, Consolidation Coal Company of West Virginia, presided at the meeting.

The lecture and films were presented by C. M. Donahue, sales manager of the mining department of Mine Safety Appliances Company of Pittsburgh. Donahue was accompanied by H. R. Johnson of Uniontown, Pa., and C. V. Miller of Fairmont. Donahue displayed and explained several types of rescue equipment and emergency breathing apparatuses, many of which were developed during the war for use by the armed forces.

One of the color films was the first taken of the coal and methane explosion demonstrations staged at intervals by the United States Bureau of Mines in its experimental mine at Bruceton, Pa. The second film dealt with experimental work being conducted in fighting coal fires with a combination of water and rock-dust.

The audience at the meeting was swelled by the presence of out-of-town guests, many of whom were in Fairmont to attend the two-day meeting of the West Virginia Coal Mining Institute at the Fairmont Hotel.

New Plant Under Construction

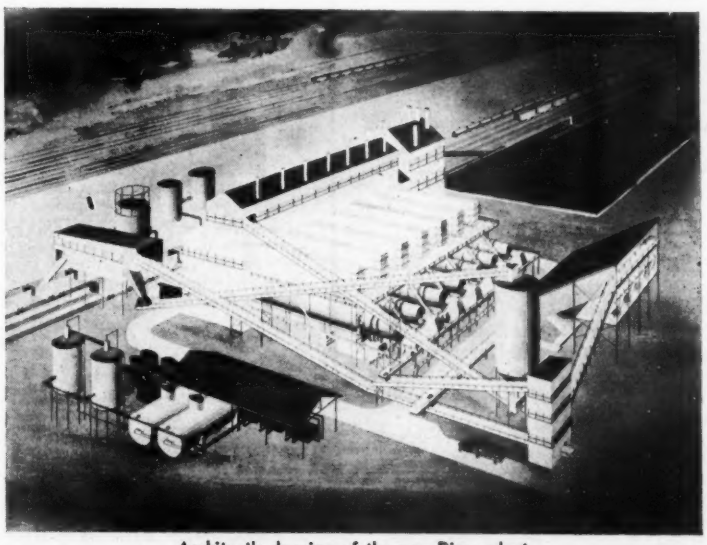
An important step toward more complete utilization of bituminous coal is seen in the recent announcement by the Disco Company, subsidiary of Pittsburgh Consolidation Coal Company, of its plans to construct a $3,000,000 coal conversion plant and tar refinery.

This new plant, the announcement stated, will make a smokeless solid fuel known as Disco and will refine coal tar into a number of chemicals.

The method for making coke by what is known as a low-temperature process is one on which the company began its first research in 1928. In 1931 a pilot plant was built and the first low-temperature coke (Disco) for commercial use was produced in a small unit which began operations in 1933. Additions to the plant were made in 1935 and again in 1936. The company has since been making and selling about 6,000 tons of this smokeless fuel monthly.

Carl E. Lesher, president of the Disco Company, said in making the announcement:

"The decision to build a large-scale commercial coal conversion plant—the first in this country to utilize a low-temperature process—with capac-



Architect's drawing of the new Disco plant

ity to consume more than 1,000 tons of high volatile coal daily and producing 800 daily tons of Disco, is another result of the recent merger that formed Pittsburgh Consolidation Coal Company."

"Several factors," Mr. Lesher declared, "buttress our confidence that this large commercial low-temperature coke plant will be the forerunner of others that will be built in coal-consuming areas throughout the country."

Continuing, he declared:

"Having operated a small-scale Disco plant and tar refinery for several years, the problems originally encountered in the process and in the equipment to produce this product are back of us. Actually, it means that when we start operating the new plant we are just stepping up the output.

"Another point is that there is a strong demand for the by-products of crude tar produced by this low-temperature process of making coke."

The new tar refinery, Mr. Lesher pointed out, will produce four primary tar products. These include: tar acid oil—about 1,400,000 gallons annually—used extensively for disinfectants and in making cleaning compounds; Creosote—about 1,250,000 gallons annually—used principally in wood preserving; fuel pitch—950,000 gallons annually—used by steel mills and others as an industrial fuel and some 5,000 tons annually of pitch coke, a granular coke product used principally for purifying industrial gases and chemicals and as a water purifier.

"Point three," Mr. Lesher asserted, "is that there is a growing demand in many sections of the country for a smokeless solid fuel that can be hand-fired in existing furnaces, stoves and grates."

The new plant will be built about 19 miles west of Pittsburgh adjacent to a large coal-cleaning and preparation plant operated by Pittsburgh Coal Company and adjoining the present small-scale Disco and tar-producing unit. Construction began in June on this project. The plant is scheduled for operation in October, 1948.

A Century of Coal Mining

The Borden Mining Company, believed to be the nation's oldest coal-mining organization still doing business under its original charter, celebrated its 100th anniversary near Frostburg, Md., on June 1, with a barbecue on top of Big Savage Mountain.

More than 250 nearby residents plus a group of friends from New Jersey crowded into Big Savage Inn as guests of Albert G. Borden, president of the company, and son of William Borden, one of nine New Englanders who founded the company in 1847.

D. Lindley Sloan, retired Chief Justice of the Maryland Court of Appeals, hailed the company and Mr. Borden, who lives in South Orange, N. J., as "the friendliest outsiders that ever came into our county."

The Borden Company, according to Mr. Sloan, "found gold in these hills." In search of iron ore, which quickly petered out, William Borden and his associates stumbled onto rich veins of bituminous coal, Mr. Sloan reported. "They turned their iron interests to coal, and turned the coal into gold."

The mining began only five years after the Baltimore & Ohio Railroad was put through this area and three years before the Cumberland Canal was opened, Mr. Sloan said. For nearly 60 years the company dug coal out of Big Vein and shipped it north to the manufacturing centers of New England.

Borden coal went to blacksmiths, blowers of glass, the old Fall River Line, and for many years to the Cunard Steamship Line. By 1905, however, the Big Vein seam was depleted and the company turned over the mining of smaller veins to various lessees. The company property now covers 4,500 acres in the basin and on the slopes of Big Savage Mountain.

Coal Pier to be Enlarged

In order to expedite the heavy movement of coal which is going over its Curtis Bay Coal Pier in Baltimore, the Baltimore & Ohio Railroad is more than doubling the capacity of its coal yard at that point. During the war years this yard had a capacity of about 400 cars. Sufficient tracks are now being laid down to give it a capacity of 605 additional cars, or an increase of more than 30,000 tons.

Coal is the base of the economy of most of the European nations and vital to the restoration of their industries. Of the huge volume now being allocated for export to these countries about a million tons a month are scheduled to be sent out through the Port of Baltimore, and somewhat more than half of this moves over the Curtis Bay Pier.

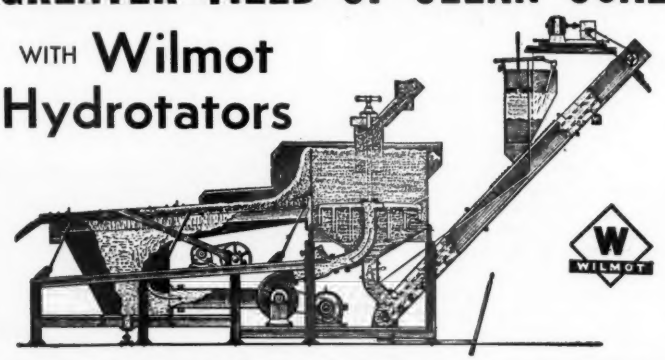
Fur Mining Practice

Recently the tipple crew at a mine at Thomas, W. Va., while engaged in picking foreign matter from the belt which carries the car from the tipple, where the trucks dump the strip coal to the railroad cars, were surprised by what seemed to be the body of a groundhog which suddenly appeared

NOW

GREATER YIELD OF CLEAN COAL

WITH Wilmot Hydrotators



NEW AUTOMATIC CONTROLS in Wilmot Hydrotators are effecting marked increases in quantity and quality of product. For example, loss of good coal during periods of interrupted feed is prevented by an automatically controlled valve in refuse discharge line. Let us send you complete details of the advanced engineering of Wilmot Hydrotators.

Wilmot Builds Better Breakers

WILMOT
A GREAT NAME IN THE COAL INDUSTRY

Write for Hydrotator Bulletin HR

HYDROTATOR *Preparation* EQUIPMENT

WILMOT ENGINEERING COMPANY, HAZLETON, PA.

on the picking belt. However, instead of being dead the object proved to be very much alive and after 25 minutes hard labor, the crew managed to get the animal off the belt. Its weight was estimated at 70 pounds.

There are several dams on the stream near Davis, W. Va., and presumably this animal came from one of the colonies of beavers at that point. The coal being loaded came from the strippings between Thomas and Davis. It is loaded from the bed into trucks by power shovels and it is very unlikely that the crew of the shovel and of the truck would fail to see such an object. It is thought that the beaver came out of the drift in the Freeport seam which is on a level with the belt.

The animal was given to the West Virginia game authorities.

New Preparation Plant

The Powhatan Mining Co. at Powhatan Point, Ohio, is planning a complete new coal preparation plant with a capacity of 100 tons per hour to be installed at the Powhatan mine by Roberts & Schaefer Co. This plant will clean ¼ x 0-in. coal in Stump Air-Flow coal-cleaning units.

Mine Abandoned

The Bland mine in Harlan County, Kentucky, which was closed down some time ago, is being abandoned by the R. C. Tway Coal Co. of Louisville. The mine has been virtually worked out and was one of the 12 declared as unsafe by the Coal Mines Administration shortly following the Centralia disaster. The operation had been closed prior to Centralia and according to company officials, its being held unsafe had no bearing on the decision to abandon operations as this had been planned previously.

Strip Operation Opened

The Apex Coal Co., which is affiliated with Pittsburg & Midway Coal Mining Co., have been opening a new strip operation at Charleston, Hopkins County, Ky. The mine is on the Illinois Central Railway and has a capacity of 650 tons daily at the present time. The general superintendent is William R. Winters, of Millstadt, Ill.

L. E. YOUNG
Consulting Engineer
Mine Mechanization
Mine Management
Oliver Building **Pittsburgh, Pa.**

Shorts, overloads and other faults in your mine electrical distribution system can cause costly damage to machinery and tumble your production schedule. That's why you should sectionalize your trolley and feeder circuits with I-T-E Type KSC Automatic Reclosing Circuit Breakers.

When a fault occurs, the KSC automatically opens, and recloses only when the fault has been corrected. It isolates the affected area to prevent interruption of production in other areas. This cuts lost time to a minimum—contributes to higher production.

As shown in the diagram above, a disconnect switch or protective device should be placed in every power line at not over 1500 foot intervals. An overcurrent protective device should be used in each circuit leaving a substation. These can be fuses or circuit breakers of the manual or the automatic reclosing type. (If circuit breakers are employed, trip free operating mechanism should be used.) The exception to this is where a substation feeds the main haulage only and only one haulage unit at one time. In this case only one breaker is required at the station.

There are other important applications—too numerous to mention here. Full details can be obtained by contacting the I-T-E Mining Specialist in your neighborhood. He will be glad to make an application analysis of your electrical distribution system. So use him—at no obligation.

Be Wise SECTIONALIZE

I-T-E Circuit Breaker Company

19TH AND HAMILTON STREETS, PHILADELPHIA 30, PA.

(2ND OF A SERIES ON RECOMMENDED SECTIONALIZING PRACTICE USING THE KSC)

I-T-E SECTIONALIZING Switchgear

New Scholarships Established

Two four-year tuition scholarships in mining engineering have been established at the University of Kentucky starting next September. The Princess Elkhorn Coal Co. of David, Ky., is sponsoring these scholarships. According to Dean D. V. Terrell of the University of Kentucky, College of Engineering, the coal company will also offer summer work to the two students. President David L. Francis of the Princess Elkhorn Coal Co., states that the company would sponsor the education of eight prospective mining engineers in the near future.

Annual BCR Meeting

Coal technology and the bituminous coal industry's intensive program to take full advantage of science, received major attention during two meetings of Bituminous Coal Research, Inc., held at Columbus, Ohio, June 3 and 4.

The first session, the annual membership meeting, took place in the Deshler-Wallick Hotel and then adjourned to Battelle Memorial Institute in the afternoon for an inspection of BCR projects.

Howard N. Eavenson, Pittsburgh, president of BCR, presided during the annual meeting. Nearly 150 coal company executives and engineers attended. At a board meeting, following the annual meeting, all officers of the BCR agency were reelected. They are Mr. Eavenson, president; R. H. Sherwood, Indianapolis, president, Central Indiana Coal Company; Mr. Morrow, and Harold J. Rose, Pittsburgh, director of research, vice presidents; M. L. Garvey, Washington, D. C., treasurer; C. A. Reed, secretary, and J. F. Hanley, assistant secretary and treasurer, both of Washington, D. C.

"BCR in Action" was the theme of the annual meeting. Introduced by President Eavenson, Director of Research Harold J. Rose called on a dozen speakers to give the highlights of accomplishments and developments in the national research program.

E. R. Kaiser, assistant to president and assistant director of research, then described the mining development program now being organized by the industry.

Kaiser reported that 13 coal-producing companies, seven land companies and four railroads have made definite pledges to the mining program, with "at least 50 per cent of the $250,000 quota in sight." Additional information on participation may be obtained from the Pittsburgh office of BCR or from Howard N. Eavenson, chairman of the temporary steering committee, and its members, including Thomas H. Clagett, Pocahontas Land Corporation; R. L. Ireland, Hanna Division, Pittsburgh Consolidation Coal Company; R. H. Morris, Gauley Mountain Coal Company; Dr. C. J. Potter, Rochester & Pittsburgh Coal Company; E. R. Price, Inland Steel Company; T. J. Thomas, Valier Coal Company; and W. J. Tuohy, The Chesapeake and Ohio Railway Company.

After reporting that BCR is a major contributor to the Coal Research Laboratory of Carnegie Institute of Technology, Pittsburgh, because of the importance of fundamental or basic research, Dr. Rose introduced Dr. H. C. Howard, assistant director of Carnegie's coal research program, who advised that his department has continued work in three fields of combustion — gasification, carbonization and chemical reactions—with a staff now expanded to pre-war levels.

Up-to-the-minute developments in the coal-burning gas-turbine locomotive project were then reported by John I. Yellott, Baltimore, Md., director of research, BCR Locomotive Development Committee. He told of the progress to date on industry research designed to hold the "largest single market for bituminous coal"—fueling the steam locomotives of the country —and advised that the coal-fired gas-turbine promises operating savings, especially in fuel costs, for the railroads.

"BCR Activities at Battelle" were described by B. A. Landry, supervisor, fuel division, Battelle Memorial Institute at Columbus, who also reported what is being done by BCR to develop hand-fired smokeless heating equipment. He then introduced four of his associates, as follows, who described and pictured other BCR projects being handled by the Battelle divisions:

Dr. H. W. Nelson, assistant supervisor, fuels division, "Residential Stokers"; R. B. Engdahl, another assistant supervisor, "Flow Problems in Coal Utilization"; A. C. Richardson, supervisor, coal preparation division, "Coal Drying Processes"; and E. D. Benton, assistant supervisor, fuels division, "Improving the Steam Locomotive." He told of recent developments on application of overfire steam-air jets, emphasizing that the railroads are making extensive use of these devices on road engines as well as switchers.

W. S. Major, development engineer, reported that "industry is increasingly installing overfire air jets in the interests of smoke abatement," with over 5,000 plants now making use of this "combustion tool." He also outlined BCR activities to stimulate jet use, including (1) establishing basic reference plants to show what jets can do for smoke abatement, (2) jet talks before groups of engineers, (3) jet clinics, and (4) jet publicity in trade magazines and the press.

T. A. Day, special representative of BCR, was the last staff speaker.

"In 1943," he said, "BCR became a truly national research agency for bituminous coal. It represented more than 150 million tons of annual production, and it continued to grow the next year and the next year. In 1945, the agency was made up of 193 coal companies and associations as well as nine coal-carrying railroads. Today—two years later—the membership of BCR includes 256 coal companies and associations, 63 of which have been added in the past 24-month period; 14 railroads, five of which were added in 1946-47; and three equipment companies, all added since 1945.

Legislation Postponed

Action on the Jackson bill to regulate strip mining has been postponed by the Ohio Senate Conservation Committee. The vote was taken after two months of study and consideration of recommendations of the nine-member Ohio Strip Mining Study Commission, which was created by the preceding session of the legislature.

New Freeport Subsidiary

Freeport Sulphur Co. has formed a new subsidiary, The Micronizer Co., to engage in grinding materials to extremely fine particle sizes by a process known as "Micronizing," Langbourne M. Williams, Jr., president of Freeport has announced.

The new Freeport subsidiary has purchased the assets of International Pulverizing Corp. and affiliated companies, including American Pulverizing Corp., Micronizer Processing Co., Inc., and Micronized Products, Inc. It will operate existing plants at Moorestown, N. J., and Charlotte, Mich., and will grind sulphur for agricultural use, organic insecticides such as DDT, inorganic pigments, pharmaceuticals and other materials.

Tipple Producing

Island Creek Coal Company's new tipple is starting commercial preparation. Located on the Cedar Grove seam near Cedar Grove, W. Va., the plant will have an eventual capacity of 2,500 tons daily to be reached about July, 1948. Plans are under way for three additional new mines. One on the Eagle seam which will produce 2,000 tons per day and two on the Cedar Grove seam which will produce 4,000 tons per day each. Mine No. 25, which opened in May is expected to develop 5,000 tons daily by the fall of 1948.

Central States

The St. Lawrence Project and Our Iron Mines

The Lake Superior iron ore industry is confident of its ability to produce large tonnages of high-grade ore for an almost unlimited time by concentrating the lower grade deposits, according to Alexander C. Brown, president of the Cleveland-Cliffs Iron Co.

His remarks were made in a statement opposing the St. Lawrence Waterway Project to the Senate Foreign Relations Committee early in June.

"The Lake Superior iron ore industry has long recognized that it could not depend upon the known reserves of commercial grade ores to supply the steel industry indefinitely in the future," Mr. Brown said.

"The question naturally arises as to how future demands for iron ore are to be met, when the time arrives that the Lake Superior ores of now commercial grades are not sufficient. For that time will come, if our industrial development is to continue as we have every reason to anticipate.

"The industry is fully aware of that contingency and is extensively engaged and has been for some years —in making plans to meet it. In brief, it expects to produce iron ore for the blast furnaces, when and as needed, and in gradually increasing tonnages, by concentrating the abundant iron-bearing rock—the so-called "taconite" and "jasper" from which nature produced the ores we now mine. The reserves of taconite and jasper are measurable in billions of tons.

"This iron ore industry is confident of its ability eventually to supply large volumes of high-grade iron ore concentrates from this source for an almost unlimited time, provided it is permitted to continue unhampered, in a normal evolutionary pattern, the progress already made on the technical and economic problems involved in this undertaking. All the major producing companies are engaged in this. The future of a vast population, not only those dependent on the mining industry, but many others in the whole Great Lakes basin, is dependent upon the successful culmination of this taconite and jasper program. The self-sufficiency of our country in one of the most vital of raw materials is dependent on it. The alternative—of allowing our steel industry to become dependent on foreign sources of iron ore—is unthinkable and completely unsound from a national policy point of view."

Mr. Brown then pointed out that the dumping of foreign iron on the domestic market via the St. Lawrence Waterway would seriously disturb market conditions and effect adversely the research program on taconites. He then stated:

"The Lakes region, the heart of American industry, certainly will be invaded eventually by foreign industrial producers with the economic aid of the proposed waterway. At present the Great Lakes region is largely self-contained in its economy. Lake Superior ore, shipping on the lakes, and coal from the lower lakes region supply the steel industry, which in turn is the basis for endless other industries. All these sustain a vast population which constitutes the market, not only for its own manufactures but for the products of agriculture of the surrounding region.

"As producers of iron ore from the Lake Superior region, who expect to keep on producing iron ore, and eventually produce high-grade concentrate from taconite and jasper as well, we see in the St. Lawrence Waterway only a threat to the normal expansion and development of our industry, to the shipping dependent on it, and to the whole economy of the Great Lakes region.

"The vast capital required for taconite and jasper concentration plants —estimated at 10 to 15 million dollars per million tons of product—probably would not be forthcoming until the effect of the St. Lawrence Waterway upon the iron and steel industries were revealed by operation of the project over some years. If the investment in these plants is not made, the steel industry would become more and more dependent upon the importation of foreign iron ore.

"Those who believe the St. Lawrence Waterway is desirable, essentially for military reasons, should consider whether a new line of communication between the coast and the middle west is more essential to national defense than an adequate supply of domestic iron ore for the steel industry."

Radioactive Survey Under Way

During June and July, the state geological survey of Kansas is making a radioactive survey of portions of the Tri-State zinc and lead mining district in Cherokee county. The survey is under direction of Dr. Robert M. Dreyer, associate professor of geology at the University of Kansas and geophysicist for the state geological survey. Dr. Dreyer was in charge of the last comprehensive geophysical survey of the Tri-State area in 1941.

It has been found in some places that traces of radioactive elements are associated with some metallic ores and can be used to guide the search for such ores. In this survey an attempt will be made to ascertain whether there are any small amounts of radioactive elements which can be used in prospecting for new deposits of zinc and lead minerals in the Tri-State area.

New Combustion Development

A recent engineering development in the production of char from coking bituminous coal which will make this product desirable for steam and power generating stations was described June 18 in a paper presented at Chicago before a fuels session of the semi-annual meeting of The American Society of Mechanical Engineers. The authors, A. D. Singh, president of the Singh Company, Chicago, and L. J. Kane, chemical engineer with the Bureau of Mines, were both formerly associated with The Institute of Gas Technology, Chicago, which made a study of the fluidization process as applied to the devolatilization of this type of coal.

Pointing out that the direct combustion of high volatile coal for the production of heat energy is subject to certain drawbacks, the authors cited a study which gives the following advantages of power char over raw coal as a fuel:

In the pulverization process, the power requirement is 20 per cent less,

SAUERMAN

1-Man Excavator and Conveyor

Sauerman Drag Scraper and bulldozer work together to strip deep layer of mushy overburden from ore body.

Whatever your materials—ore, coal, boulders, sand, gravel, clay—you can move it fast and efficiently with a long range SAUERMAN machine of either cableway or scraper type—at a great saving in cost. Machine is flexible; range is easily extended. Sturdy design and construction for long, dependable service. Electric, gasoline, diesel or steam power.

SAUERMAN BROS., Inc.

540 S. Clinton St., Chicago 7, Ill.

and maintenance generally lower. It has higher rates of combustion with a considerably shorter flame, resulting in increased furnace capacity. Savings of 4 to 5 per cent in fuel can be effected because of its appreciably lower hydrogen content and reduced surface moisture. It is more free-flowing in the pulverized form, thus simplifying the handling problem. Danger of spontaneous combustion is almost entirely eliminated.

After reviewing the technical and economic factors which have, in previous years, prevented the development of a satisfactory process for the production of char, the authors listed new engineering developments for its production and utilization which have either been applied successfully on a commercial scale, or show a good promise of practical application.

Taconite Concentrator Planned

Contracts have been let by Erie Mining Co., for the erection of a preliminary full-sized iron ore concentrator for the treatment of taconite on a site three miles north of Aurora, Minn. The new concentrator will be completed for the ore season of 1948. Orders for crushing and concentrating machinery have been placed with manufacturers.

A contract has been let to strip 150,000 cubic yards of material to uncover 600,000 tons of taconite, preparatory to the completion of the plant. The contracting firm also is building a railroad grade to the mine property and clearing a site for the new ore plant.

A Veteran Passes On

Veteran shovel operators in the Hull-Rust-Mahoning open pit mine are just a little sad because they have lost a real friend—a veteran of mining operations in the big hole.

Old No. 3, Marion 350 electric shovel is on its way to a new job and no longer will the familiar shovel, that appeared in more pictures than any other mine shovel seen in operation on the Mesabi Range.

It has become a dredge and was removed to New Haven, Conn., where it will be operated from a scow.

In 1921 it was a steam shovel, taking hundreds and hundreds of tons of ore from the big pit. In 1930 it was electrified and continued to do its job of getting out the ore, establishing new records in the recent war.

Iron Activity Reflected in Car Order

The Duluth, Missabe & Iron Range railway has ordered 2,000 70-ton cars at a cost of $9,600,000 from four firms with delivery set for next April 1, Paul H. Van Hoven, president of the railroad announced.

The new cars will replace 3,000 50-ton cars which are now 40 or more years old. This will be the largest single expenditure for car replacement in the history of the road.

The D. M. & I. R., the largest ore-carrying railway in the country, now has 13,925 ore cars in operation, 2,000 of them of the 70-ton type which were purchased during the war years.

The new cars will be built by the American Car and Foundry Co., General American Transportation Co.; Pressed Steel Car Co., and Pullman Car Standard Manufacturing Co.

The cars will be 24 ft. long, the maximum length permitted by ore dock design, and will be all-steel with the most modern safety devices.

Diesels Can Be Used

An amendment to the state mining code whereby diesel engines, equipped with adequate safety equipment, are permitted to operate in lead and zinc mines in Oklahoma was passed in

Parmanco
MECHANICAL FEED
HORIZONTAL DRILL
WITH TRACTION DRIVE

Ten years of field test has proven that our power-feed design of direct, transmission and worm gearing with two-speed control will not only cut shot hole drilling time in half but also eliminates costly maintenance delays. V-belt drive to the power-feed with an additional ample clutch in that assembly gives absolute control of a drilling speed of two to three feet per minute with a retrieving speed of twenty-four feet per minute.

The Parmanco Horizontal is adapted to all forms of high-wall drilling, will handle a six-inch auger up to a distance of sixty feet or more and, by use of our patented augers with interrupted flights and secondary cutters, will drill an absolutely clean hole with a minimum of torque. It permits the drilling of a controlled-angle hole which makes possible a great saving of explosives through the cantilever effect of this controlled-angle drilled hole.

EFFICIENT STRIPPING STARTS
WITH EFFICIENT DRILLING

PARIS MANUFACTURING COMPANY
PARIS, ILLINOIS

May by the State Senate and House of Representatives.

With diesel engines already used in some underground operations in both Kansas and Missouri, the legislation, which awaits the approval of the Governor, will be helpful in reducing mining costs in certain operations.

Zinc Recovery Planned

American Smelting & Refining Co. has started construction work on an addition to its smelter at El Paso, Tex. The new unit, an entirely separate plant, is designed for the recovery of zinc from the slag dumps which have been amassed over a long period.

Craig Co. Expanding Operations

Preparations are being made by the Craig Mining Co. to resume and expand operations at the Riverside mines south of Joplin, Mo.

The company completed the new Willard shaft last year and a test run of the ore rock was made only recently at the Waco mill.

New Shaft Site Chosen

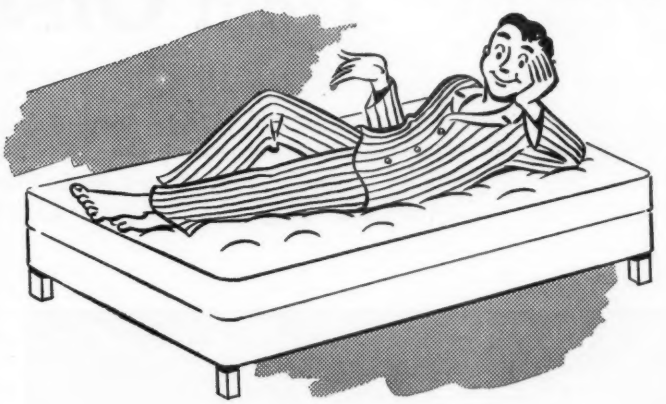
The Cleveland-Cliffs Iron Co. has cleared off a site chosen for a new production shaft on the Marquette iron range to be known as "B" shaft. It will ultimately be a deep shaft and similar to the present Mather shaft at Ishpeming, Mich., at present the hoisting outlet for Mather mine iron ore on the Marquette range. The Mather shaft is located in the city of Ishpeming, and the new shaft will be located about a mile away in the city limits of Negaunee. Underground development in the Mather mine is being extended and will eventually be tied in with the new shaft.

The Cleveland-Cliffs Iron Co. is continuing its exploration for new orebodies on the Marquette iron range, to keep pace with the annual shipments of iron ore from its properties. The new shaft will be about 1,500 ft. to the southeast of the company's Cambria-Jackson mine, and will eventually be put down to a depth of more than 3,000 ft.

Tailings Treatment Suspended

Evans-Wallower Zinc, Inc., has suspended the retreatment of tailings at its No. 4 plant east of Cardin, Okla., for the purpose of treating ore rock from its No. 16 mine on the old Golden Rod No. 9 lease a half mile southeast of the mill, it was announced recently by Floyd W. Gooch of Joplin, manager. Ore rock from the mine previously was treated on a custom basis over the Scott mill of the Scott Mining Co. east of Hockerville, Gooch said.

STEEL IS CHEAP!



As You Repose On Your Steel Spring-Filled Mattress— Try To Think Of Just One Basic Commodity Priced Anywhere Near As Low As Steel

They are few and far between.

The Iron Age composite price of finished steel is less than 3¢ per lb.

It has advanced less than ⅓ of a cent per lb. in the last ten years.

Applied to the cost of steel used in any product, this modest average increase adds little. Here are a few examples:

$1.35 more for 450 lbs. of steel for Nails in a G. I. Home.

$6.90 more for 2300 lbs. of steel for fence to fence a 40 Acre Field.

$0.60 more for 200 lbs. of steel in a Refrigerator.

$4.50 more for 1500 lbs. of steel in a Farm Tractor.

$7.50 more for 2500 lbs. of steel in a Motor Car.

It is very obvious that the cost of living is affected very little by the price charged by steel manufacturers.

SHEFFIELD STEEL

SHEFFIELD STEEL CORPORATION

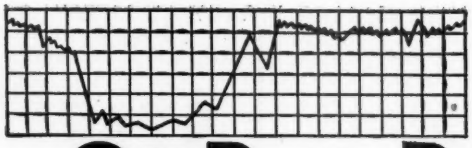
HOUSTON KANSAS CITY TULSA

Carbon and Alloy Steel, Ingots, Blooms, Billets, Plates. Sheets, Merchant Bars, Steel Joists, Struct. Shapes, Road Guard Reinforcing Bars

Welded Wire Mesh, Wire Products, Wire Rods, Fence, Spring Wire, Nails, Rivets, Grinding Media, Forgings, Track Spikes, Bolt & Nut Products

SALES OFFICES: Chicago, Ill.; St. Louis, Mo.; Des Moines, Ia.; Wichita, Kans.; Denver, Colo.; Oklahoma City, Okla.; Dallas, Tex.; San Antonio, Tex.; New Orleans, La.

Charge Them From Off-Peak Power



When you use EDISON Nickel-Iron-Alkaline Batteries as the power units of your battery-operated haulage equipment, you will find that an off-peak period of 6 to 7 hours per day is usually enough to get all the charging done with low-cost power. That is normally time enough for full recharge of a nickel-iron-alkaline battery.

The charging can also be done direct from the d-c power lines through suitable resistors, because EDISON Nickel-Iron-Alkaline Batteries do not require critical adjustment of the charge rates.

Withstands Rough Usage—

Yet this is only one of the operating advantages of EDISON Nickel-Iron-Alkaline Batteries. Their steel cell construction successfully withstands rough usage. Their electrolyte is an alkaline solution that is a natural preservative of steel. Their electro-chemical principle of operation is free from self-destructive reactions. As a result, they stay on the job and out of the repair shop; give longer service life than any other type of battery; cut annual operating cost. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. In Canada: International Equipment Company, Limited, Montreal and Toronto.*

In Mine Locomotive and Shuttle Cars EDISON Nickel-Iron-Alkaline Batteries Give You These Important Advantages

★ They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.

★ They are **foolproof electrically;** are not injured by short-circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.

★ They can be **charged rapidly;** do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.

★ They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.

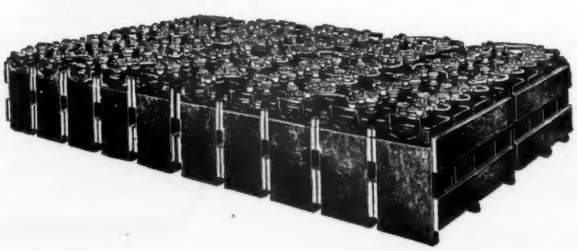
★ They can **stand idle indefinitely** without injury, without attention, and without expense.

★ They are **simple and easy to maintain.**

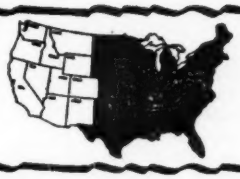
EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES



Western States



Mining Problems Discussed

The New Mexico Miners and Prospectors' Association was represented June 2 at Denver at a meeting of the Select Committee on Small Business of which Representative William S. Hill is chairman of the sub-committee. The meeting considered problems relating to the mining industry and its future needs, particularly the small independent mine operators. Attending were Jack C. Pierce, executive secretary; George Warner, Albuquerque; Morgan G. Huntington, Socorro; Allen Bowman and W. S. Harrison, Lordsburg.

New Mining Law

A new law designed to encourage development of Washington state mineral resources and reduce the tax load of mining corporations during the development stage became effective June 12.

This law, passed by the last legislature, permits corporations which do not own or operate any producing mine to pay a minimum annual incorporation fee of $10, irrespective of capitalization. After a mine starts producing, it pays the same fee as any other corporation.

The law also permits reinstatement, on payment of delinquent fees, of mining corporations that have been dissolved for failure to pay annual license fees.

Progress Continues at Old Gold Camp

The operation of Telluride Mines Inc. centers around the old Smuggler Union operation at Telluride, Colo. Ore from the Smuggler Union property was first shipped in 1875 and since that time, with minor shutdowns, production has continued steadily. Around the nucleus have been gathered for operation the properties of Tomboy Gold Mines Inc., Cimarron, Shamrock, South Bradley, Pioneer, Lewis, Double Eagle and many smaller groups.

The Smuggler Union water supply, power plants and milling plants, with additions, supply the facilities. Principal operations are carried on above the Pennsylvania tunnel. At this time mining is in progress in the Pandora, Flat, Smuggler and Montana veins. All stoping is by shrinkage stopes. Haulage on main levels is with electric locomotives and two-ton cars. Hand tramming and with trains pulled with little trammers is also used according to advantage in intermediate levels.

A lower tunnel known as the Mill Level tunnel is being carried in from the mill tram floor level. The equipment for this, although ordered in 1945, has not all arrived at this time. In the meantime the work at the portal and driving of the tunnel has proceeded slowly due both to manpower shortage and slow arrival of equipment. This tunnel is being driven at an elevation between 1,100 and 1,200 ft. below the Pennsylvania tunnel.

Summer Convention Scheduled

The Mining Association of Montana will hold its ninth summer convention in Butte at the Hotel Finlen, on August 3 and 4, with part of the program a mineral and machinery exhibition.

Among the speakers scheduled are R. W. Diamond, vice president and general manager of the Consolidated Mining & Smelting Co. of Canada, who will address the convention with "The Trend of Things and Our Responsibilities"; Evan Just, editor of the *Engineering and Mining Journal*, talking on "Highlights on the Mining Outlook"; and Harry J. Evans, vice president of the Elkhorn-Beaverhead Mines, Inc., who will have for his subject, "Foreign Strategic Minerals."

Meeting of Unusual Interest Planned for El Paso

AN INDUSTRY-WIDE Program Committee, under the chairmanship of Donald H. McLaughlin, president of Homestake Mining Company, is meeting on July 15 at Salt Lake City, Utah, to draw up plans for the 1947 Metal Mining Convention of the American Mining Congress, Western Division, to be held at El Paso, Tex., October 27-29.

To date, suggested subjects for discussion at El Paso have been unusually broad in scope and the Program Committee will have a diversified series of topics from which to select the Convention agenda. Outstanding speakers will be secured to discuss the major economic, legislative and operating problems of the industry today. As the International Mining Days celebration will take place in conjunction with the meeting, many mining men are also expected from nearby operations in Mexico.

Requests for hotel reservations should be made *immediately* through J. J. Shores, Secretary, Mining Committee, El Paso Chamber of Commerce.

STATE CHAIRMEN

Alaska
CHARLES J. JOHNSON
Goodnews Bay Mining Co.

Arizona
R. W. HUGHES
Miami Copper Co.

California
GORDON GOULD
H. W. Gould & Co.

Colorado
B. T. POXSON
Emperius Mining Co.

Idaho
ROSS D. LEISK
Sunshine Mining Co.

Montana
E. S. McGLONE
Anaconda Copper Mining Co.

Nevada
ROY A. HARDY
Getchell Mine, Inc.

New Mexico
IRA L. WRIGHT
Black Hawk Consolidated Mines Co.

Oregon
S. H. WILLISTON
Cordero Mining Co.

Texas
H. E. TREICHLER
Texas Gulf Sulphur Co.

Tri-State District
O. W. BILHARZ
Bilharz Mining Co.

Utah
PAUL HUNT
Park Utah Consolidated Mines Co.

Washington
WRAY FARMIN
Spokane, Wash.

Mining Association Meets

J. B. Haffner, manager of Bunker Hill-Sullivan Mine, Kellogg, Idaho, was elected president of the Idaho Mining Association by delegates at a two-day session held at Sun Valley late in May. He succeeds John D. Bradley, San Francisco, president of Bradley Mining Company.

Other officers elected by the delegates include A. H. Shoemaker, manager, Triumph Mine, Hailey, Idaho, vice president; Wallace G. Woolf, Bunker Hill-Sullivan Mine, Kellogg, Idaho, chairman of executive committee and following members of executive committee: Henry L. Day, Wallace; Tom C. Russell, Anaconda Copper Co., Conda; J. E. Perg, manager, Federal Mining Co., Wallace, and H. D. Bailey, Bradley Mining Co., Stibnite.

John D. Bradley, president of Bradley Mining Co., San Francisco, and president of Idaho Mining Association, and Harry W. Marsh, secretary, with Governor C. A. Robbins on his arrival at Sun Valley to address delegates to the 18th annual Idaho State Mining Association convention

Speakers on the program were Oscar W. Worthine, Boise, who discussed "Labor Laws"; L. H. McGuire, engineer-in-charge, Bureau of Mines, Seattle Safety Division, "New Developments in Metal Mines Safety"; Charles E. Duffy, former member of Idaho Industrial Accident Board, "The Closed Shop and What Stems From It"; Roy S. Hooper, assistant mine superintendent, Bunker Hill and Sullivan Company, "Some Thoughts About Mine Labor"; Stanley A. Easton, president, Bunker Hill and Sullivan Mining Company, Kellogg, Idaho, and Reno H. Sales, chief geologist, Anaconda Copper Co., Butte, Mont., who described "Prospectors and the Developers of Mines."

E. W. Hansen, Simplot Fertilizer Co., Pocatello, spoke on "Phosphate Fertilizer," and A. W. Fahrenwald, director of the Idaho Bureau of Mines and Geology, outlined details of "Geology of the Idaho Phosphate Beds."

Highlighting the afternoon program was a premier showing of the film, "From Phosphate to Superphosphate Fertilizer" produced by the Simplot Company.

The convention closed with an address by Donald A. Callahan, first vice president, American Mining Congress, at a banquet in the Sun Valley Lodge dining room at which Edward P. Ryan, Spokane, was toastmaster.

Silver-Lead Property Being Drilled

Diamond drills are exploring virgin ground from the 500- and 600-ft. levels of the old Cerro Gordo lead-silver mine five miles east of Keeler, Calif. Development work is progressing and considerable ore is said to have been shipped recently. The property is held under lease from the Silver Spear Mining Co. of Los Angeles by W. C. Rigg, of Santa Monica.

Gold Property to Operate

Early operation of the Oro Plata gold property near Murphys, Calif., is scheduled by California Gold Mines Inc. Equipment has been reconditioned, power facilities restored and test runs made at the mill on developed ore. Located near the noted Carson Hill group, and other formerly important gold producers, the property is held under lease by present operators from Union Cons. Mining Co.

Mine Purchased

The Hecla Mining Co., of Wallace, Idaho, has purchased the Blacktail mine in Montana, a newly discovered silver-lead property. The Blacktail is located about 30 miles southeast of Missoula and was discovered last fall by Roy Hughes and Leonard Shaubel, who drove a tunnel on the ore showing for a distance of 140 ft., financed by a loan from the RFC.

The new property is described by Hecla engineers as being a good prospect on which Hecla has started a program of development work. A trial carload of the ore will be shipped to the company's mill at Gem, said L. E. Hanley, president and manager, until the ore shows further development and a detailed program can be worked out.

Placer Purchased

J. C. Roberts and Frank Kelly and associates of Spokane recently purchased the old McKay placer ground in Bivins Gulch, northwest of Virginia City, Mont., from the Swayze estate. About 5½ miles of placer ground in the one-time famous gold-producing area is involved in the deal. The new owners plan to commence development operations at once.

New Tailings Dam

The Colorado Fluorspar Inc., at Brown's Canyon, near Salida, Colo., has completed construction of a large tailing dam built from some 15,000 yards of compacted earth fill. This has been constructed across the mouth of Three Mile Creek which had been previously diverted. This will afford the impounding of tailings for the company's mill for the next five years and will do much toward curtailing the running of muddy water and other wastes into the Arkansas River. The work at the mine is under the direction of Roy Hickman, of Salida.

Gold Operations to Resume

Early resumption of work at the Oregon King mine near Madras, one of the best producers of gold and silver in central Oregon but closed since war days, now is expected. The owners of the property attempted to resume operations last spring but were forced again to close after a brief start for lack of labor as well as the inability to get pumping machinery.

Shaft Sinking Continues

Reports from Salt Lake City, Utah, state that Chief Cons. Mining Co. has continued sinking its new Evans group shaft below the 500-ft. level. Stations are also being cut and more than 2,000 ft. of drifting will be commenced.

Let Us Fill Your Requirements
for
DOUGLAS FIR MINE TIMBERS
and
MINE LAGGING
All Sizes and Grades *Prompt Shipment*
COON CREEK TIMBER CO.
Airport Road
ROSEBURG, OREGON

Phosphate Experiments Started

Experiments are now under way by the Idaho School of Mines, the Anaconda Copper Mining Co. and the J. R. Simplot Co. which should result in the development of a large phosphate mining industry. At the recent meeting of the Idaho Mining Association at Sun Valley, T. C. Cutler, Jr., chief engineer for the Simplot Company, said that the company has plans to launch a new $5,000,000 enterprise for the production of high concentrate phosphate fertilizer. The product will be made from salvaged phosphate shales which are normally wasted in the production of superphosphate and will be made by electric furnace process. This process is now being tested out on a large scale and is expected to produce 50,000 tons of 47 per cent phosphate fertilizer per year.

The San Francisco Chemical Company is at present the largest producer of phosphate rock in the state from its Waterloo mine at Montpielier. This company is shipping 60,000 tons of phosphate rock per month.

Shaft Timbering Completed

Final shaft timbering preparatory to mining operations is under way in the Hillside shaft of the Nevada Equity Mining Co., near Austin, Nev. Preparations are under way to erect ore bins as it is planned to ship ore produced in the development work. Shipments of development ore will provide data for mill design.

The diamond drill is down 338 ft. in its fifth hole and it is expected the hole will be finished at this depth. The Audubon vein was struck at 130 ft. and displayed quartz and surfides. No information has been given on assay values.

Mill to be Moved

F. E. Chon and John Oliver, who have purchased the surface properties and equipment of the Westgate custom mill, have announced they plan to move the mill to Manhattan, Nev. The mill handled considerable custom ore prior to the war. Chon and Oliver operate the Keystone property near Manhattan and will use the mill on Keystone ores.

Drilling Under Way

The Tonopah Development Company is drilling a series of holes over a large section of ground north of Tonopah, Nev. This is the first major development in the Tonopah area for many years. The company is represented by M. A. Diskin, former Nevada attorney general.

The new company has acquired a group of more than 20 claims, and drilling is currently under way about a half mile southeast of the Victor shaft of the Tonopah Extension, which was one of the largest Tonopah producers of rich ore in the early days of the camp.

The first operation will drill to a depth of 1,000 ft. for the purpose of gaining an accurate idea of the area's geology, and later holes are expected to reach a depth of 2,000 ft.

A Small Mine is Growing

The importance of the development of small mines to the future of metal mining in New Mexico has been demonstrated by Carl S. Elayer, of Silver City, mine operator and former superintendent of the Ground Hog Unit of the American Smelting & Refining Company, at Vanadium, Grant County, N. Mex. Elayer is now operating successfully a small mine in the Magdalena District, Socorro County, which in 297 days produced a total of $172,576.31 in lead-zinc ore, with a payroll during this period of $44,443.15.

Manganese Operation Expands

Expanding into large-scale production are operations of the United Mining & Milling Corporation, organized in 1944 to develop manganese deposits located six miles south of Socorro, N. Mex. President of the corporation is Morgan G. Huntington, who is also general manager in charge of the property. Ore is mined by open-pit methods employing power shovels. Mining plant includes a concentrator

School of Mines Trip

The Midwest, from Denver to Milwaukee and back again, was turned into a classroom recently by the senior class of the Colorado School of Mines.

Seventy-five students and faculty members of the Golden, Colo., school made a 12-day tour during which they inspected coal and lead mines, refineries, smelters, zinc, brass and glass plants, steel works such as Carnegie near Chicago, power plants, Milwaukee's Allis-Chalmers and other industrial concerns, and Union Pacific Railroad's Omaha shops.

In addition to Milwaukee, Chicago and Omaha, major stops on the itinerary included Joplin, Kansas City and St. Louis, Mo.

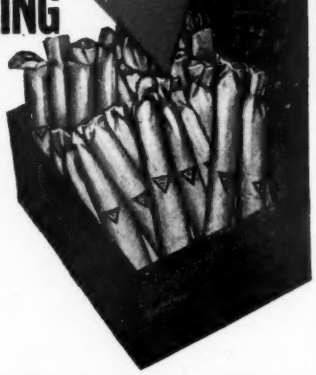
While professors, engineers and workmen explained the functioning of equipment at the installations visited, students busily made notes for the detailed reports they were to prepare at the close of the tour. Classroom credit is given for the trip, an annual affair for members of the senior class.

In charge of Professor Clark B. Carpenter of the school's Department of Metallurgy, the group included students from Canada, South America, Denmark, China, the Philippine Islands, India, Russia, Germany, Sweden and Panama.

These 75 students and faculty members of the Colorado School of Mines turn Union Pacific's power house at Omaha into a classroom

KEEPS DUMMIES SAFE
from BREAKING and SPILLING

High wet strength and safety-seam for double safety



Blasting procedure is streamlined with dummies made with Seal-Tite Tamping Bags. Labor, time and cost is reduced . . . A supply of dummies is quickly and simply made up at one time — and stored underground, safe from breaking and spilling—in Seal-Tite Tamping Bags.

Under humid conditions, the *high wet-strength* chemically-processed Sealtite kraft won't tear or break—and the safety-seam won't open.

They're *tough*, too—they can stand the gaff in rough handling.

SEND FOR SAMPLES TO TRY OUT

Of course, you'll want to put them to the test. Send for free samples of Seal-Tite Tamping Bags in the sizes you want or we'll send an assortment of sizes—Just write!

Tamping Bag Co.

216 SO. THIRD ST.
MT. VERNON, ILL.

and Diesel power plant. More than 4,000 tons of metallurgical grade manganese concentrates has been produced. Huntington has had over 20 years of practical mining experience and served as associate mining engineer for the War Department and also as a mining engineer with the U. S. Bureau of Mines. He was a former superintendent of the Las Guijas tungsten mine in Arizona and assistant underground manager of the Stan Trg mine in Yugoslavia before the war.

Millsite Purchased

The Athletic Mining and Smelting Company, Klondike, Ariz., has purchased the old Grand Reef millsite from the American Lead and Zinc Company and is planning to erect a 100-ton mill. The plant will be designed to handle custom ores from the Aravaipa district as well as from the company's Head Center and Iron Cap properties. These claims, also located in the Aravaipa district, have been producing a carload of lead-zinc ore daily. Harvie L. Horton, of Safford, Ariz., is vice president and general manager of the company. Raymond F. Orr and A. K. Orr of Fort Smith, Ark., are president and secretary-treasurer, respectively.

Claims to be Drilled

Approximately 100 claims in the vicinity of Tucson, Ariz., near Tiger, Ariz., have been acquired by San Pedro Mines Company, and preparations are being made to churn drill the deposit to determine its production possibilities. The claims are located between the Reynolds and Mammoth-St. Anthony properties and include those owned by Mrs. Vivian Singleton of Mammoth, who is active in the new company.

New Recreation Center

Announcement has been made by the New Cornelia Branch, Phelps Dodge Corporation, that construction of a recreational center at Ajo, Ariz., is to be undertaken at an early date. The building will house a theater, a library and a large recreational hall with approximately 5,200 sq. ft. of floor space. Both stage and kitchen facilities are to be included so that the hall may be used for general community activities. In an effort to expand and improve housing conditions in Ajo, the corporation recently let a contract to a Phoenix construction company for the erection of 51 residences, and the initial construction crews have started work.

Dredging Equipment to be Shipped

The newly formed Gold Dredge Estate, Ltd., in Fairbanks, Alaska, will have an office of the company in Seattle, Wash. R. R. Reed, who will be field manager for the newly formed organization, has arrived in Fairbanks from his home in Portland, Oreg., to take charge of operations this year in the Koyukuk on Pocahontas Creek, parallel to Utopia Creek. George F. Webb in Seattle, who is chairman of the board, will attend to the shipment of machinery, such as a gold washing dredge, other equipment and supplies which will be sent from Seattle to Alaska.

Drilling Started

The Sullivan Mining Company, jointly owned by Hecla Mining Co. and Bunker Hill and Sullivan Mining and Concentrating Co., has started diamond drilling operations in the Metaline zinc-lead field of Washington.

Oregon Miners Meet

Outstanding leaders in Oregon's mining circles assembled May 24 in the Redwoods Hotel dining room at Grants Pass, Oreg., to consider the present plight of Oregon's mining industry, seriously stricken by war conditions and other factors since the peak days of 1940.

President Fay Bristol, of the Bristol Silica Company, Rogue River, outlined the recent history of the Oregon Mining Association and introduced a number of leading official, scientific and industrial men concerned with the development of the state's mineral resources.

Introductions included members of the legislative interim committee on surface mining, who had conducted a survey of dredge and placer mining in the two counties of Josephine and Jackson.

Members of the governing board and officials of the State Department of Geology and Mineral Industries also attended.

INVESTIGATE

Mine Operators, Engineers, Prospectors

WEST'S greatest untouched mineral area. Interested parties can secure free copy recent survey of mineral deposits. Available for operating and development.

Write

SUSANVILLE CHAMBER OF COMMERCE

Susanville, California

First speaker on the program was Richard Anderson, resident engineer, Raw Materials Survey Council. Under the subject, "Raw Materials Resources — Industrial Opportunities," Anderson outlined the new types of mineral needs developed in general industry. He disclosed briefly the scope of operations of the Survey Council, which was created and financed by chamber of commerce and other business interests of the Pacific Northwest.

E. K. Peterson, regional administrator, Oregon and California Lands Administration, the next speaker, gave the history of the federal legislation and regulations which have blocked the staking of mining claims under regular mining laws on revested lands.

Senator Rex Ellis took charge of an open hearing by the surface mining interim committee of which he is chairman. Director Libby, of the State Department of Geology and Mineral Industries, also appeared on the afternoon program.

Following action on proposed resolutions, the meeting adjourned.

Tungsten Carbide Bits

(*Continued from page* 37)

in a percussion drill with regular detachable bits. This latter method is more satisfactory, in that it is possible to drill through thick bands of abrasive rock but the rotary drill is faster in ore and will produce more feet of hole per shift. At the Book Mine, due to the travel time required by the men at the beginning and end of the shift and at the lunch period, we estimate that about six hours a day are spent in the actual operation of the rotary drill. Three 50-ft. holes or four 40-ft. holes are not uncommon for a shift's work if it is not necessary to change the set-up of the machine during the shift.

At the Book Mine, the percussion method of long-hole drilling cannot be used with the ordinary equipment of a heavy jackhammer and ⅞-in. steel. Water cannot be forced through the small diameter hole in this steel with sufficient force to remove the large amount of sludge produced.

Suggested Change in Design

Whether or not this experience will be of any value in other districts can be determined only by experiment. In ores which are more abrasive and which form less sludge the method of percussion drilling with detachable bits is at present more satisfactory. It must be remembered, however, that the tungsten carbide bits used were designed and developed for use in the rocks of the coal fields and no modification has been made to adapt them to use in other rocks and ores. The weak spot in the present design is in the thin tabular insert. As most of the wear occurs at the periphery it would seem that the use of a wedge-shaped insert is indicated, with sufficient thickness to prevent breakage of the insert. With the rapidly increasing cost of bort it would seem that a large potential market exists for the manufacturer of hard-metal bits who can eliminate the weak points of the present design.

— BOOK REVIEW —

FREE GOLD. *The Story of Canadian Mining. By Arnold Hoffman. Illustrated by Irwin D. Hoffman. Rinehart & Company, Inc., New York and Toronto.* 420 *pages.* $5.00.

TO those who think that the days of mining venture are gone, this book will furnish a much-needed shot in the arm. "Free Gold" is much more than a history of the search for gold mines in Canada; it is a saga of hardship, adventure, perseverance, technical skill and financial enterprise in the Northern Frontier of the Continent.

The book is written in a humorous and racy style. Sandwiched in with the story of Canadian mining is personal reminiscence and a number of excellent yarns of the rugged life of the prospector in the Canadian bush. There is also a chapter on the nature of mineral deposits and two chapters which describe financing of Canadian mining ventures.

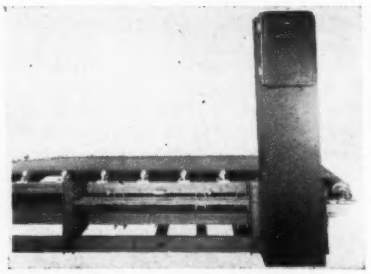
Wisely concentrating upon the human rather than the technical aspects, Arnold Hoffman has written an entertaining and instructive book. He has successfully portrayed the spirit of Canadian mining venture and the illustrations of his talented brother, Irwin D. Hoffman, contribute notably to the attractiveness of the format. We doubt if another author could have done a better job. Hoffman's Canadian mining experience has been extensive and his love for the North, and the prospector who pioneered its mines, enables him to write with both sympathy and understanding.

Although "Free Gold" may not be a definitive work, it should be in the library of every mining man. The history of Canadian mine development from Cobalt to Yellowknife can be found within its pages. It is hoped that the spirit of eternal youth which permeates the text, and some of the zest for adventure that has so characterized Canadian mining, will be reborn within our own borders.

MANUFACTURERS FORUM

New Method of Continuous Weighing

A new development in the continuous weighing of dry materials on conveyor belts is offered by Builders-Providence, Inc., of Providence, R. I., in the Conveyoflo Meter. This meter utilizes diaphragms instead of the usual knife-edge-beam principle for metering flow of dry materials by weight. Bulky overhead framework,



scale beams, knife edges, tie rods, etc., are eliminated, resulting in a simpler unit, occupying less space than the usual conveyor scale.

The continuous weighing of such materials as coal, gravel, stone, powdered chemicals, ore (newly mined and crushed), and many other products is often of importance when careful control is required in a processing circuit. The scales may be used to proportion and control, as well as weigh, the feed of one or more dry materials such as cement, sand and gravel, and ore to ball mills. It is claimed that the new device will also control the flow of liquids in proportion to the flow of dry materials.

Integration is automatically compensated for variations in belt weight and for adherence of material to the belt, through a system of return belt weighing.

Car Shakeout

Among the new labor, time, and expense saving machinery on display at the Railway Supply Manufacturers' convention June 22-28 in Atlantic City was the Robins Car Shakeout, a portable electric-powered device which unloads hopper-bottom railroad cars of coal, coke, ore, minerals and other materials in as little as 90 seconds. The machine literally shakes free-flowing bulk materials out of tightly packed cars without any damage to the cars, or danger to workmen. This materials-handling machine was developed by the Robins Conveyors Division, Hewitt-Robins Inc.

It is claimed that the machine empties hopper-bottom cars "broom clean" so rapidly that entire trainloads can be unloaded quickly without uncoupling the locomotive.

Previously cars were damaged when workers beat them with sledges to unload wet or frozen materials. The manual labor was costly, slow, and often dangerous. Four to six men spent as much as two hours per car under the old method. Worst of all, valuable time was lost by railroad cars and engines being idle on sidings, frequently involving demurrage charges.

Portable P&H Welder

A new self-powered arc welder, designed for shop, yard and field service, is now offered by Harnischfeger Corporation, Milwaukee, Wis.

The P&H Model WN-200 welder, available as a stationary or trailer unit, is an N.E.M.A. rated machine of 200 amps., but has a welding service range of from 30 to 260 amps. Both types have engine and welder securely mounted on an all-welded frame of sturdy steel tubing and heavy angle iron. The skid model is ideal for carrying on trucks. A large lifting eye for crane lifting is provided.

The trailer model has been engineered especially for use in the field. Carried on a running gear of standard track width, the trailer welder has standard size pneumatic tires as regular equipment.

Both models are equipped with P&H's square frame arc welding generators, having a welding service range of from 30 to 260 amps. There is just one control for any desired welding heat from minimum to maximum capacity. Arc response is automatic on all classes of work and with all types of electrodes. Like all P&H arc welders, the new model WN-200 also has "Visi-matic" calibration plates which enable the operator to select instantly the exact welding current for each of the three classes of electrodes.

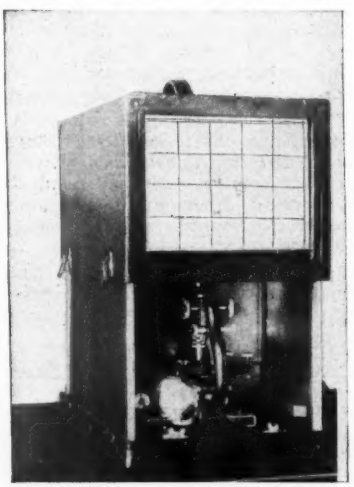
Literature describing both P&H Models WN-200 portable welders can be obtained by writing Harnischfeger Corporation, Welding Division, 4400 W. National Avenue, Milwaukee 14, Wis.

New M.S.A. Microprojector

The M.S.A. Dust-Vue Microprojector, designed to simplify the determination of numerical concentrations of impinger and precipitator dust samples, is said to eliminate time-consuming direct microscope-counting of dust particles and the severe eyestrain attendant upon this method. The instrument projects the microscopic field image on a ruled, translucent screen, 250mm x 200mm, with a magnification of 1,000 diameters. This greatly enlarged image makes dust counting faster, easier, and more accurate—enables dust particles to be distinguished from pits and bubbles in the glass of the cell—and permits more concentrated samples to be counted without secondary dilution.

Readily portable and sturdily built, the microprojector can be conveniently used for field as well as laboratory work. Light is provided by a tungsten-mercury arc lamp.

Any standard fork-stand type microscope can be used. It is placed directly under the microprojector screen, thereby simplifying aligning and fo-



cusing, and making remote controls unnecessary. A removable screen shield permits light-room counting.

Further information is available in Bulletin No. CT-7 and will be furnished upon application to Mine Safety Appliances Company, Braddock, Thomas, and Meade Streets, Pittsburgh 8, Pa.

New Shovel Announced

Marion Power Shovel Company, of Marion, Ohio, has announced a new ¾-cu. yd. machine—the 33-M. With various front-end combinations, it is a shovel, dragline, clamshell, crane and backhoe.

Features claimed for the new MARION include Marion air control, a greatly simplified machinery deck with only two shafts across the deck, simple changeovers for front-end equipment, the use of 22 ball and roller bearings. Only 12 gears are used in the entire machine.

Conversion of the front end does not require any changes of drum lagging, sprockets, levers, etc. The same drums are used on all combinations. The shovel boom also serves as the boom for the backhoe. The crane boom point is adaptable without change for crane, clamshell, dragline and pile driver service. Air control covers all digging motions, gear changes and the operation of the steering clutches, propel brake, swing brake, dipper trip and engine clutch. A maximum of 12 lb. pressure operates any air control lever.

The new 33-M is the smallest machine in the MARION line, other sizes ranging up to 40 cubic yards.

The New Jackbit

A new stud-type jackbit, with an attachment member that is designated as the jackstud, has been added to the Ingersoll-Rand line of rock drilling equipment.

The bit has new, carefully worked out wing curves that enable it to retain bit proportions through many resharpenings. It is claimed that the resulting small gage loss permits using successive bits with reductions in diameter of 1/16-in. or less per change. This makes it possible to start holes with smaller bits than those previously used and still bottom them at the same size as before. Drilling speeds are consequently higher than before and the time consumed per hole is less.

The Jackstud, which connects the bit to the drill rod, is made of high grade, carburized alloy steel selected to withstand this service. One end, cone-shaped and deeply furrowed, is driven while cold into the heated end of a drill rod. The driving operation can be readily performed with a drill steel sharpener.

The projecting end of the stud has improved reversed buttress type threads for attachment of the bit. The threads are case hardened to retain their shape and resist wear and, as they extend up to the driving shoulder, there is no undercut into which the bit skirts can upset and become locked on. The Jackstud can be satisfactorily used with any drill steel, whether it is of the carbon or alloy type.

Additional information is contained in Form 4062, obtainable from Ingersoll-Rand Company, 11 Broadway, New York 4, N. Y., or any of its branch offices.

Rubber Lined Tanks

The longest rubber lined tanks believed to be shipped in one piece were recently rubber lined by Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J.

The two tanks were exported to a Brazilian steel mill where they will be used for a continuous strip pickle line where scale is removed from steel strip. The complete shipment properly skidded and crated weighed over 44 tons. The two tanks were loaded on three railroad flat cars, because of their extreme length, and taken to an Atlantic port where they were hoisted aboard ship and lashed for the long trip to South America. Complete with removable sectional fume hoods, each tank measured 62 ft. long, 7 ft. wide, and 6 ft. high.

All rubber lining for acid pickling units must be specially compounded to withstand the corrosive attack of acid and high temperatures. Because of the extreme length of these two tanks, special preparations had to be made for the vulcanization of the rubber lining.

— *Announcements* —

At a meeting of the Board of Directors of the **American Car and Foundry Company**, held May 29, in New York City, the resignation of **F. A. Stevenson** as president was accepted. Mr. Stevenson had been associated with ACF for more than 40 years in various capacities.

Charles J. Hardy, Jr.

Charles J. Hardy, Jr., who heretofore had served the company as its executive vice president, was elected to the presidency, succeeding Mr. Stevenson.

* * *

Euclid-Chicago Company, 201 North Wells Street, Chicago 6, Ill., has been appointed Euclid distributor for northwestern Indiana, northern Illinois and southern Wisconsin. Principals of the company, which will handle Euclid equipment exclusively, are **Robert M. Jones** and **Horace K. Church.** The Service and Parts Department is in charge of Harvey Landmeier; Jack Wathen is office manager.

Link-Belt Company announces reestablishing a sales office in Washington, D. C., at 1009 Washington Gas Light Bldg., located at 11th and H Streets, N. W., Washington 1, D. C., with **C. R. ("Pete") Heller,** Washington representative, in charge.

Mr. Heller's duties will be confined to work with foreign purchasing commissions and with the governmental and Armed Service Bureaus located in Washington. Industrial sales in the District of Columbia will continue to be handled by the company's office in Baltimore.

CORE DRILLING

ANYWHERE

We look into the earth

PENNSYLVANIA

DRILLING COMPANY

PITTSBURGH, PA.

ROBINSON

VENTILATING COMPANY

Fans and Blowers

Ventilating Engineering Service

ZELIENOPLE

PENNSYLVANIA

Established 1902

HOFFMAN BROS. DRILLING CO.

CONTRACTORS

DIAMOND CORE DRILLING

PUNXSUTAWNEY, PA.

Our specialty—Testing bituminous coal lands

Satisfactory cores guaranteed

UNIVERSAL SCREENS and UNIVIBE RIDDLES

Vibrating Screens and Vibratory Riddles, in many sizes and types, all priced most reasonably. . . . Tried, Proved and Guaranteed Products. Leaders in Screening Field Since 1919.

Write for Catalog on Screens and Screening

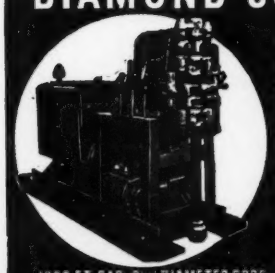
Two Deck Model 42" x 96" Motor & V-rope Dr.

UNIVERSAL VIBRATING SCREEN CO.

RACINE - - WISCONSIN

DIAMOND CORE DRILLING

CONTRACTORS



TESTING COAL AND ALL MINERAL PROPERTIES - USING OUR LIGHT GASOLINE DRILLS.. THEY SAVE FUEL AND MOVING COSTS.. WE GUARANTEE SATISFACTORY AND PROPER CORES..

PRE-PRESSURE GROUTING FOR MINE SHAFTS... GROUND SOLIDIFICATION FOR WET MINE AREAS BY OUR STOP GROUT METHOD. WATER WELLS AND DISCHARGE HOLES DRILLED AND GROUTED... ELECTRIC DRILLS FOR INSIDE MINE DRILLING..

1200 FT. CAP. 2¼" DIAMETER CORE

MOTT CORE DRILLING CO.

HUNTINGTON, W.VA.

Index To Advertisers

	Page
American Chain & Cable Co., Inc. — American Cable Division	Third cover
American Cyanamid Co. — Explosives Dept.	Second cover
Anaconda Copper Mining Co.	45
Chicago Pneumatic Tool Co.	16
Coon Creek Timber Co.	58
Dupont de Nemours Co., E. I.	12
Edison, Inc., Thos. A. — Storage Battery Division	56
Electric Storage Battery Co., The	5
Gardner-Denver Co.	38
General Electric Co.	14-15
Gould Storage Battery Corporation	10
Hoffman Bros. Drilling Co.	64
Ideal Industries, Inc.	48
Independent Pneumatic Tool Co.	8-9
I-T-E Circuit Breaker Co.	51
Jeffrey Mfg. Co.	2-3
Joy Mfg. Co.	34-35
Kennametal, Inc.	4
Link-Belt Co.	20
Mack Mfg. Corporation	13
Mine Safety Appliances Co.	Fourth cover
Mines Equipment Co.	17
Mott Core Drilling Co.	64
Ohio Brass Co.	11
Paris Mfg. Co.	54
Pennsylvania Drilling Co.	64
Robinson Ventilating Co.	64
Sauerman Bros., Inc.	53
Sheffield Steel Corporation	55
Standard Oil of California	19
Susanville Chamber of Commerce	61
Tamping Bag Co.	60
Union Pacific Railroad	18
United States Rubber Co.	6-7
Universal Vibrating Screen Co.	64
Wilmot Engineering Co.	50
Worthington Pump & Machinery Co.	31
Young, L. E.	51

TRU-LAY Preformed

for SHOVEL ROPES

• More often than not, power shovels give wire ropes a terrific beating. Heavy rocks, coarse gravel, debris of all sorts make the lines quiver with strain. Yet it is on just such service that TRU-LAY Preformed proves its ability to take punishment. Specify it for every shovel service, whether hoist lines, boom lines, thrust, racking and crowding lines, or trip cables.

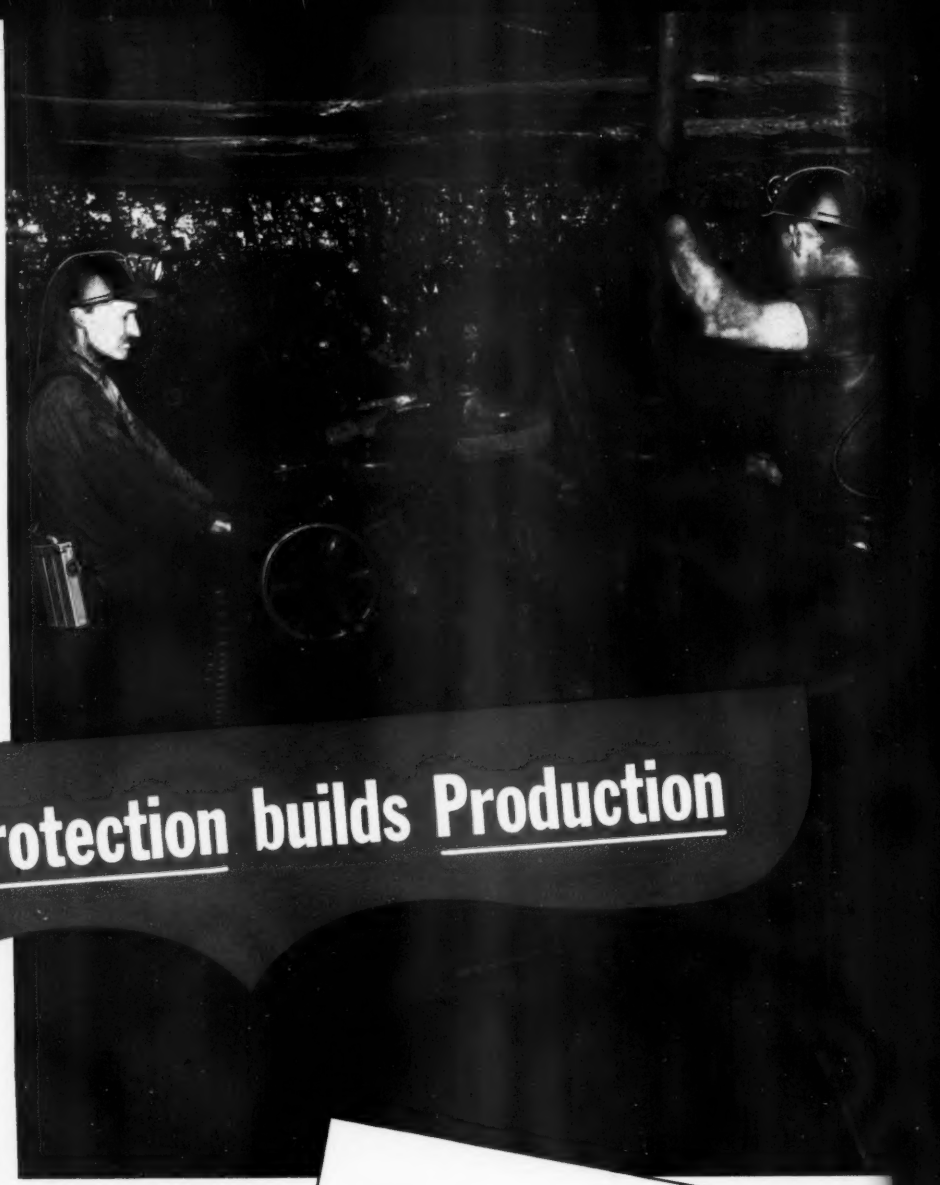
The ideal wire rope for these applications is TRU-LAY Preformed Improved Plow Steel. In that rope you get the proper combination of strength and toughness, plus fatigue-resistance and smooth spooling that gives better, longer service. Of course, TRU-LAY Preformed comes in all constructions, sizes, lays and centers.

Then, too, you can get prompt help of an experienced American Cable engineer. Every salesman of American Cable wire ropes has the exact specification (construction and grade) for *every* wire rope application. He can save you time and money. Wire or write today.

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Seattle, Bridgeport, Conn.

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

• Efficient operations underground demand well-lighted working zones and personal protection for the miner against head injuries. These requirements are provided effectively and with complete dependability by Edison Electric Cap Lamps and M.S.A. Comfo Caps—serving better production throughout the mining industry. *Write for a practical demonstration!*



Where Protection builds Production

EDISON ELECTRIC CAP LAMPS

M·S·A COMFO CAPS

MINE SAFETY APPLIANCES COMPANY

BRADDOCK, THOMAS AND MEADE STREETS . . . . . PITTSBURGH 8, PA.

District Representatives in Principal Cities

In Canada

MINE SAFETY APPLIANCES COMPANY OF CANADA LIMITED

Toronto . . . Montreal . . . Calgary . . . Winnipeg . . . Vancouver . . . New Glasgow, N. S.

SOUTH AMERICAN HEADQUARTERS — Casilla 733, Lima — Agents in Principal Cities

MINE SAFETY APPLIANCES CO. (S.A.) (PTY) LTD. — Johannesburg, South Africa — N'Dola—Northern Rhodesia